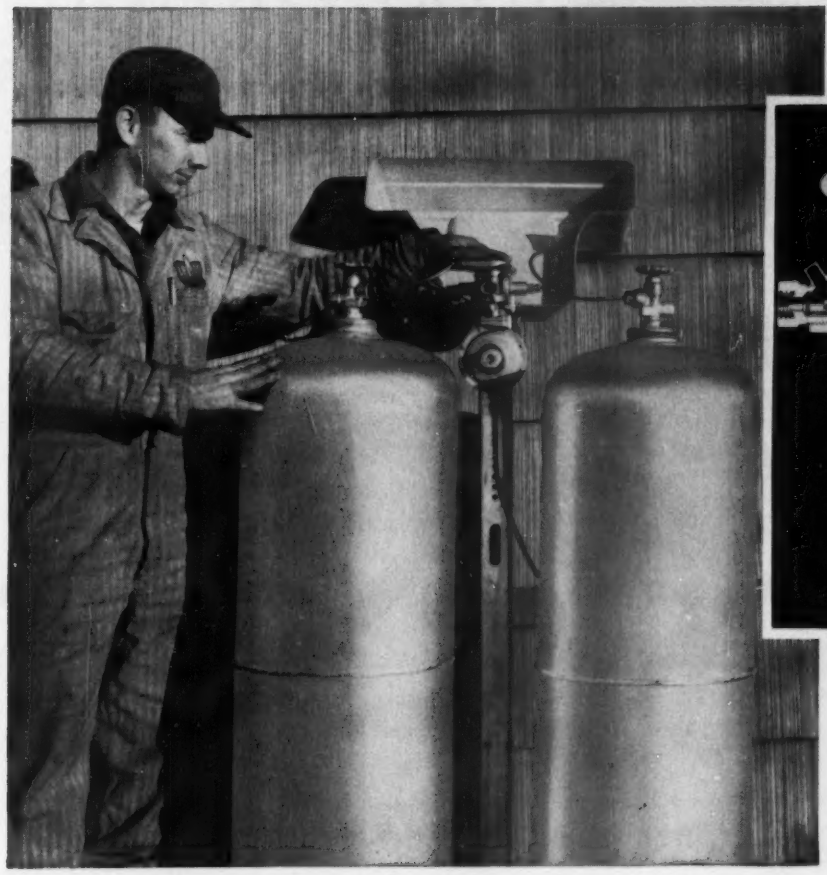
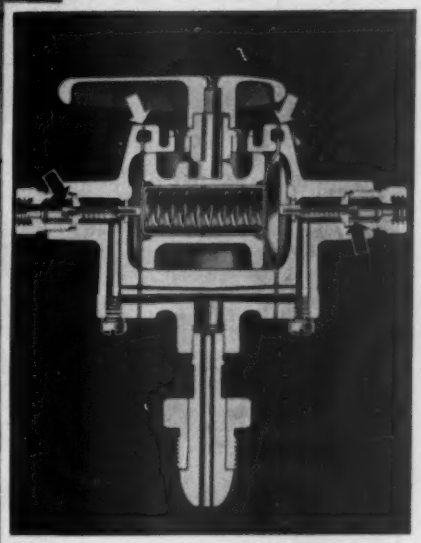
Another new development using

B. F. Goodrich Chemical *raw materials*





Automatic Change-over Regulator made by Fisher Governor Co., Marshalltown, Iowa. Rubber valves molded by Associated Rubber, Inc., Quakertown, Pa. B. F. Goodrich Chemical Company supplies the Hycar rubber only.

HYCAR KEEPS LP-GAS REGULATOR WORKING

—in any weather!

THIS regulator is built to keep a constant supply of LP-Gas flowing on bitter cold or hottest days. And keeping the *regulator* working is just the kind of a job that Hycar rubber does so well.

When the gas pressure in one tank of the dual-tank system reaches a low point, the regulator opens the other tank automatically. Gas supply is uninterrupted. Empty tanks can be replaced easily without loss of efficiency.

Vital parts of this regulator are the Hycar rubber pressure-activated valves and two Hycar-coated nylon diaphragms. To assure unfailing operation, the valve must seat properly without sticking to the metal surface. The valves and the diaphragms must also resist the deteriorating effects of liquified petroleum gas and extreme outdoor temperature changes. On every count, Hycar fills the bill! Hycar resists oil, gas, corrosion and many chemicals—remains flexible under extreme temperatures and pressures.

Helping equipment do its job right is every-day work for Hycar. Perhaps one of the many Hycar rubber compounds can solve a problem for you, help you develop more saleable products. We'll help you select the right Hycar rubber compound for your needs. For technical information, please write Dept. HB-5, B.F.Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

B. F. Goodrich Chemical Company
A Division of The B. F. Goodrich Company

Hycar
Reg. U. S. Pat. Off.
American Rubber

GEON polyvinyl materials • HYCAR American rubber • GOOD-RITE chemicals and plasticizers • HARMON colors

For moldings, tubings, tire treads, too, There's a **Philblack*** *made for you!*

Try these for size. There's a Philblack that fits your product to a T!

Philblack E beats any black for "toughness." This SAF black makes the longest-wearing tire treads ever! Outstanding abrasion resistance! Super protection against cut and crack growth.

Philblack O is used extensively by makers of tires, industrial belts and hoses. This HAF black affords excellent abrasion resistance, long flex life and good electrical conductivity.

Philblack A is an easy-processing MAF black, famous for accurate moldings, fast tubing, good appearance of finished products. High hot tensile, too, and ability to disperse heat.

Consult our technical sales representative who calls on you or write our nearest office.

PHILLIPS CHEMICAL COMPANY

PHILBLACK SALES DIVISION

EVANS BUILDING · AKRON 8, OHIO

PHILBLACK EXPORT SALES DIVISION · 80 BROADWAY · NEW YORK 8, N.Y.

* A Trademark

Philblack E, Philblack O, and Philblack A are manufactured at Borger, Texas. Warehouses in Akron, Boston, Chicago and Trenton. West Coast agent: Harwick Standard Chemical Company, Los Angeles. Canadian agent: H. L. Blachford, Ltd., Montreal and Toronto.

AIRKEM SPECIFICATIONS

#115 (oil base) for Sponge

#150 for Sponge where "Unicel" ND is blowing agent

#122 (water base) for Foam

#186 for Vinyl Film where d.o.p. is plasticiser

to reduce undesirable odors in GR-S products

Application Information

COMPATIBILITY: Will combine readily with raw mixes.

AGING: Airkem Specifications have no deleterious effect on aging properties.

TENSILE STRENGTH and RESILIENCY: Product shelf checks of more than a year's duration show that Airkem specifications in no way affect tensile strength and resiliency.

PHYSICAL PROPERTIES: Rubber products treated with Airkem Specifications are unaffected in color, foaming, setting time and density.

ODOR COUNTERACTANTS FOR THE RUBBER FIELD

Case History #12

PROBLEM: A leading producer of foam rubber mattresses and pillows was receiving complaints from dealers and consumers about offensive odors emanating from his products. Some of these odors were of low key types hardly discernible except when the user retired. Then, in direct contact, the odors became offensive.

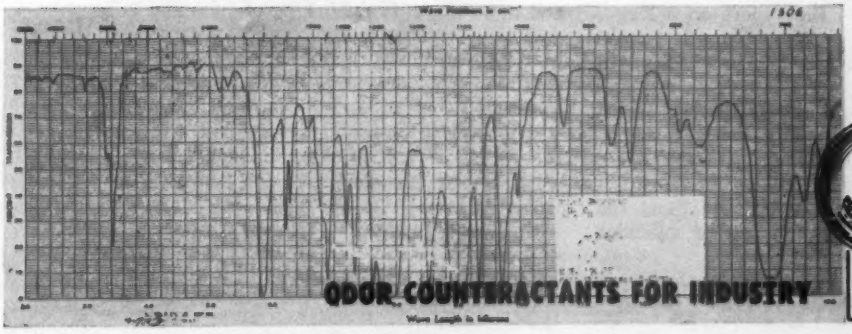
SOLUTION: Airkem engineers discovered that the odor problem was caused by a combination of contributing factors, including the GR-S latex as well as certain polysulphide accelerators. Airkem Specification 115 was added to the raw mix to the amount of ½ of 1% of the dry latex solids.

RESULT: A marked reduction in odor problems and the elimination of this source of consumer complaint. The manufacturer was able to continue with the use of GR-S Latex and other materials which contributed to high manufacturing efficiency and economy. The cost of the Airkem application is measured in pennies per mattress.

These formulations have obtained excellent results in freeing products of odor problems created by decomposed protein in slab or latex, chemical nitrogenous blowing agents, plasticisers, accelerators and stabilizers.

Do you have a problem of this nature? Airkem may be able to provide a practical, low-cost solution.

For information, please write to: **Industrial Applications Dept., Airkem, Inc., 241 E. 44th St., New York 17, N. Y.**



ODOR COUNTERACTANTS FOR INDUSTRY

airkem

PLIOVIC—ready to break production records in Eastern plant.

FILM MANUFACTURER REPORTS:

NEW HIGHS IN PRODUCTION** with **PLIOVIC

"New production record this week, last week, and the week before"—so goes the report on a large, Eastern vinyl film manufacturer. And the reason for this successively increasing production is PLIOVIC—Goodyear's polyvinyl chloride resin.

With no change in equipment and only slight modifications in compounding, this cost-conscious maker of quality film put PLIOVIC in his plant. He made a trial run and he liked what he saw. He liked the high bulk density – the easier handling. He liked the faster premixing. He liked the higher calender speeds. He liked the exceptional resistance to heat and light—the safe reworking of trim and tailings. And he liked the excellent physical properties of the finished film. Today, he and Goodyear both like the extra PLIOVIC going into his plant and the extra film coming out.

Put PLIOVIC in your plant. You'll find it to your liking, too. For full information and samples, just contact your Chemical Division representative or write to:

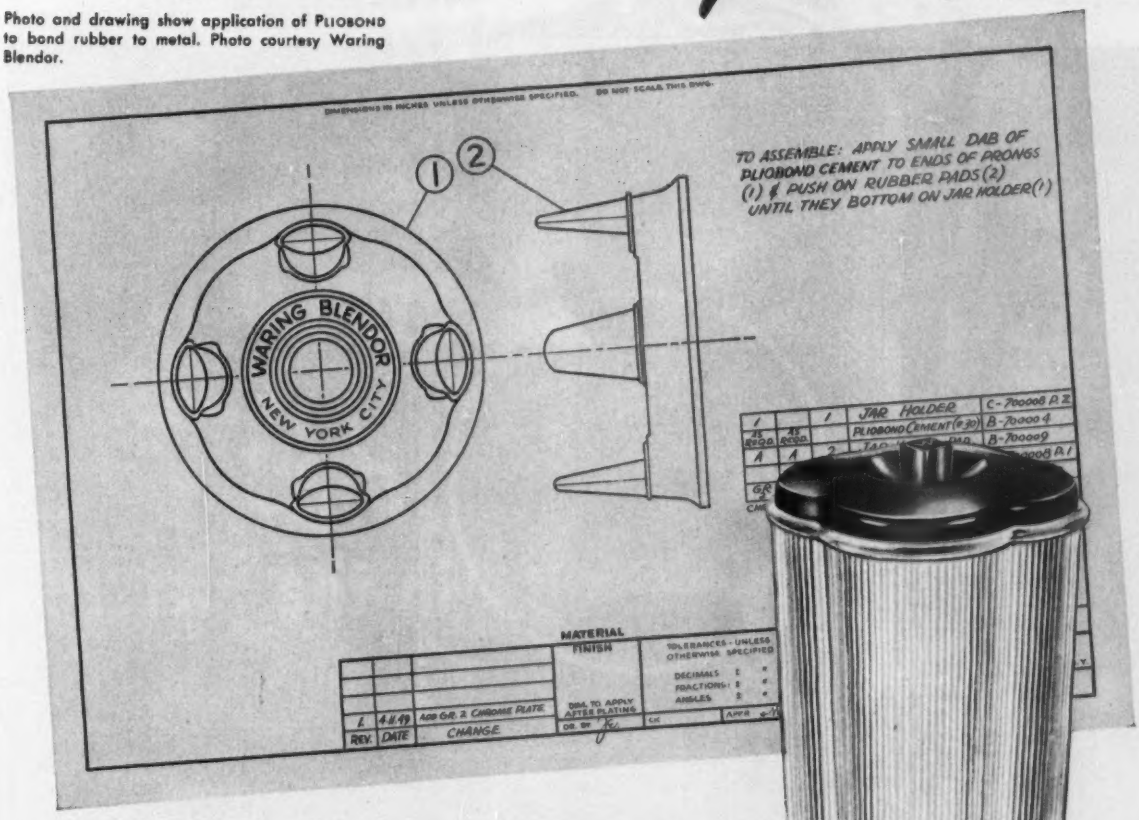
Goodyear, Chemical Division, Akron 16, Ohio

Chemigum, Pliobond, Pliolite, Pliovic—T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

Use-Proved Products — CHEMIGUM • PLIOBOND • PLIOLITE • PLIOVIC • WING-CHEMICALS —The Finest Chemicals for Industry

ANOTHER ADHESIVE PROBLEM SOLVED WITH *Pliobond*

Photo and drawing show application of PLIOBOND to bond rubber to metal. Photo courtesy Waring Blendor.


TO ASSEMBLE: APPLY SMALL DAB OF PLIOBOND CEMENT TO ENDS OF PRONGS (1) & PUSH ON RUBBER PADS (2) UNTIL THEY BOTTOM ON JAR HOLDER (1)
WARING BLENDOR
NEW YORK CITY
JAR HOLDER
PLIOBOND CEMENT
MATERIAL
FINISH
ADD GR. 2 CHROME PLATE
CHANGE

"Only cement that does the job"

bonding rubber to die-cast metal

IN making this blender, four rubber fingers are bonded to die-cast metal cores on the base. The production engineer has this to say about easily applied, easily handled PLIOBOND:

"PLIOBOND is the only adhesive that successfully does the job. We have tried other kinds of cements, found that none worked very well and in most cases were harder to handle."

PLIOBOND—Goodyear's adhesive that "bonds anything to anything"—may well be your answer to production problems, too. Write today for full details to:

Goodyear, Chemical Division, Akron 16, Ohio

We think you'll like "THE GREATEST STORY EVER TOLD"
—every Sunday—ABC Radio Network
THE GOODYEAR TELEVISION PLAYHOUSE
—every other Sunday—NBC TV Network

CHEMICAL GOODYEAR DIVISION

Chemigum, Pliobond, Pliolite, Pliovic—T.M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

Use-Proved Products — CHEMIGUM • PLIOBOND • PLIOLITE • PLIOVIC • WING-CHEMICALS • The Finest Chemicals for Industry

Life vests and life raft made of rubber save airplane crew off North Korean coast.

ZnO is definitely in the picture

"Mae West" life vests being tested in the plant of a leading rubber manufacturer. The "Mae West" is vital to the safety of American fighting men. The pilot shown in the other photo will confirm this.

Zinc Oxide is an essential ingredient in nearly all products made from either natural or synthetic rubber compounds. ST. JOE lead-free ZINC OXIDES are produced by a unique electrothermic method — a modification of the direct-from-ore, or American Process. Zinc oxides thus produced combine most of the desirable properties of the American and French Process types. ST. JOE ZINC OXIDES are available in grades to fit most any need, and their uniform high quality accounts for their wide use by the country's leading producers of rubber products.

Lead-Free

ST. JOSEPH LEAD Company
250 PARK AVENUE, N.Y. 17, N.Y.
Plant & Laboratory, Monaca (Josephtown) Pa.

RUBBER FABRICATORS NEED ACCURATE CUTTING DIES

For Cutting

Rubber, Neoprene, Plastics, etc.
Sheeting, Foam, Sponge, Cellular,
Cured & Uncured

Gang Dies Our Specialty

- Accuracy to close Tolerances
- Durability
- Genuine Understanding of the problems of rubber goods manufacturers

MALLET HANDLE DIES

PURPOSE — For those who have no machinery and do not wish to purchase any. For Cutting — Rubber, Neoprene, Plastics, etc.

ADVANTAGE — Cut direct from bolts or not.

SERVICE—One to three days.

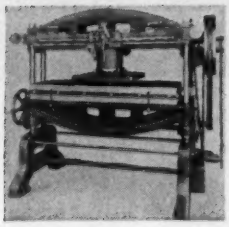
STEEL RULE CUTTING DIES

Used on Die Cutting Press, Printing Press or Power Press

PURPOSE — Especially suited for cutting — Rubber, Neoprene, Plastics, etc.

ADVANTAGE—Low in cost. Suitable for long production runs. It is necessary to cut from rectangular sheets which are fed into the press.

SERVICE—One day service.



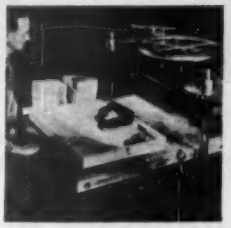
STEEL RULE CLICKER DIES

Use On Clicker Machine or Dinker Press

PURPOSE—For Cutting Rubber, Neoprene, Plastics, etc.

ADVANTAGE — More reasonably priced than the all steel dies. Recommended for small and medium quantities where cost of an all steel die is not warranted.

SERVICE—One day service.



ALL STEEL DIES

Use On Clicker Machine or Beam Press or Power Press

PURPOSE—For Cutting—Rubber, Neoprene, Plastics, etc.

ADVANTAGE — Cut direct from rolls without first cutting into sheets.

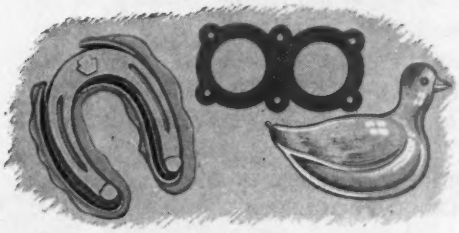
SERVICE—One to three day service on dies.

DIE CUTTING SERVICE

PURPOSE—For those who prefer to have their cutting done by others.

ADVANTAGE—We can die cut your product for you on our own presses rapidly and economically at a low "per thousand" cost.

SERVICE—One to three days.



Dies for cutting
Gaskets, flashing from molded parts, rubber soles, foam and sponge for furniture padding, inflated toys, clothing and footwear, etc.

SAME DAY SERVICE

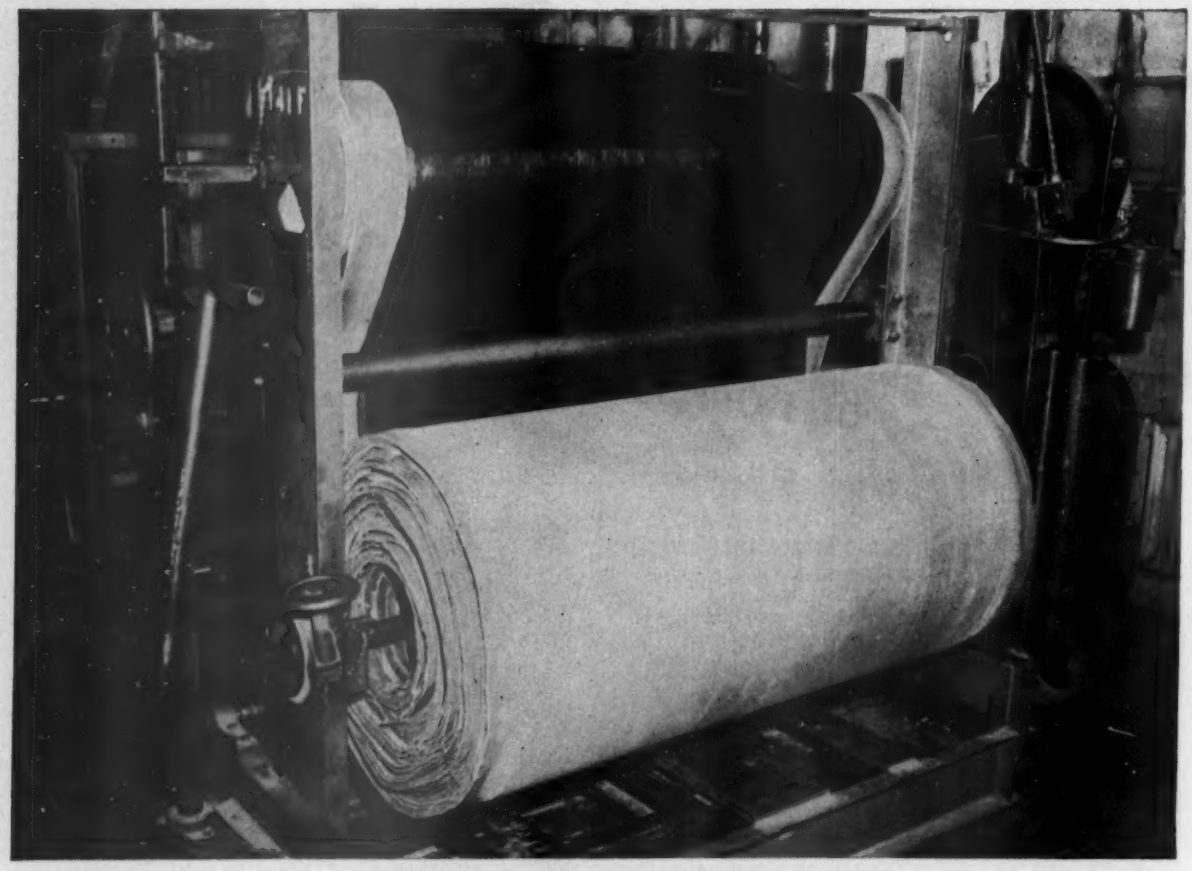
ACCURATE

STEEL RULE DIE MANUFACTURERS

24-28 West 21st Street, New York 10, N. Y. CHelsea 2-0860-1

Subsidiaries: American Fabricators; Interstate Die Cutting Co., Inc.

Intelligent Service to the Rubber Goods Industry for Over 22 Years



CLIMCO PROCESSED LINERS

Eliminate Adhesions at the Bias Cutter

If your stock has been stored in a Climco Processed Liner, you can depend on easier, faster production, and the stock always separates from the liner cleanly, easily.

And Climco Processed Liners preserve the tackiness of the stock; exclude mould, bloom and sunlight. Rejects and losses due to gauge distortion are sharply reduced.

To speed production and to lengthen liner life, Climco Processing has been accepted in the rubber industry for 31 years. For superior liners, try Climco Processed Liners.

THE CLEVELAND LINER & MFG. CO.
5508 Maurice Ave. • Cleveland 27, Ohio

GET THE FULL STORY ON CLIMCO PROCESSING

Illustrated booklet tells about Climco Liners and Linerette separating paper. Tells how to get better service from liners. Write for your copy now.

LINERETTE INTERLEAVING PAPER
Treatment Contains
NO OIL OR WAX
Samples on Request

CLIMCO
PROCESSED LINERS

FOR FASTER, BETTER PRODUCTION AT LOWER COST

Chisholm Trail

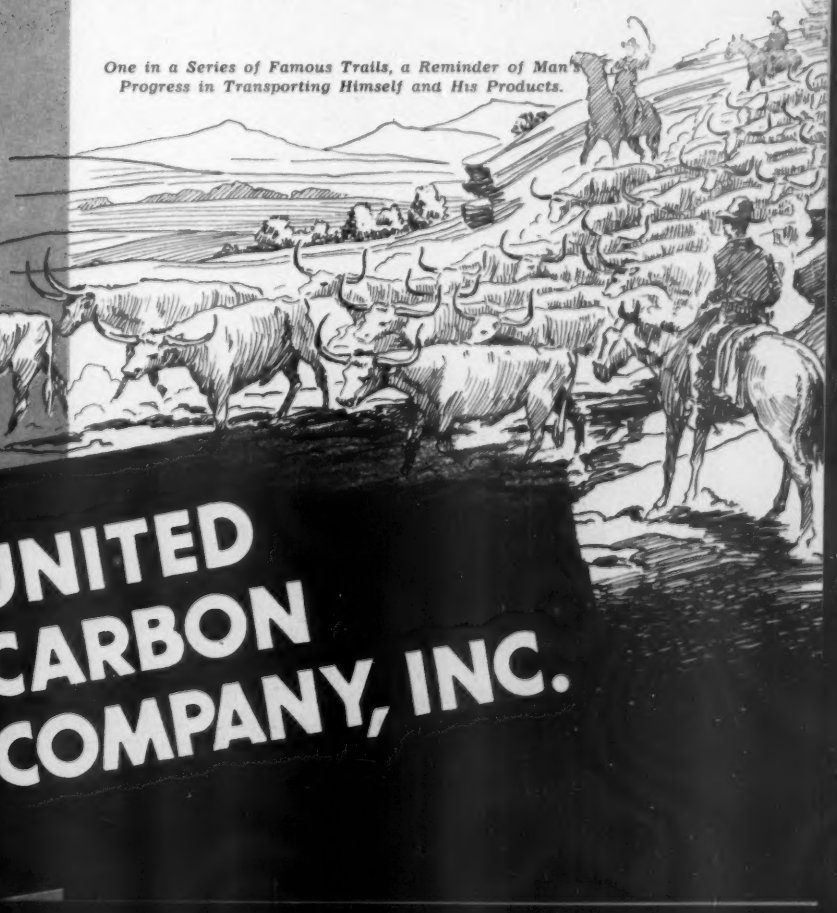
On Christmas Day 1865 the Chicago Union Stock Yards opened for business on a tract of 345 acres. Weeks later rumors reached Texas that a steer worth $5 in Confederate money would bring $40 in U. S. currency at Chicago, and round-ups began. From the brush country, the plains and the coastal regions cattle were moved to the nearest railheads.

Among the famous trails of cattle-driving days was the Chisholm Trail, named for Jesse Chisholm, a Cherokee trader and part Indian himself, who, hauling goods south from Wichita, had plainly marked the trail as he went along. Joseph McCoy later employed engineers to complete the trail north to Abilene, Kansas, a shipping point he had promoted. In June 1868, 20,000 Texas Longhorns were sold to buyers who had come out from Chicago. The next year 160,000 cattle passed through the Abilene pens, increasing to 300,000 in 1870. The Kansas Pacific railroad was kept busy supplying cars. By this time the Chisholm Trail was worn deep.

Wherever cattle are raised today, on the ranches of the west or the greener pastures of the east, cattle trucks have taken over. The Chisholm Trail, with its long, slow miles, its cowboys and its stampedes, has yielded to crisscrossing roads on which cattle trucks speed beef on the hoof to other pastures or to market.

On these trucks, as on all others which the farmer, rancher, manufacturer or retailer uses to transport his products, is today's durable rubber tire, which has made possible speed and convenience and added to man's productive time. Providing this strength and durability to the rubber tire is carbon black, and in the forefront of carbon black manufacturers is United Carbon Company.

One in a Series of Famous Trails, a Reminder of Man's Progress in Transporting Himself and His Products.



UNITED CARBON COMPANY, INC.

We are proud to introduce Kosmos 70, our superior abrasion furnace (SAF) carbon black.

Kosmos 70 marks a new development in fine particle size oil base black, combining safe processing, good resistance to cut growth, excellent electrical conductivity, and significant improvement in road wear.

Kosmos 70 is recommended for both natural and synthetic rubber. It is the special black for products where results count most.

Kosmos 70 — use it and you will be pleased.

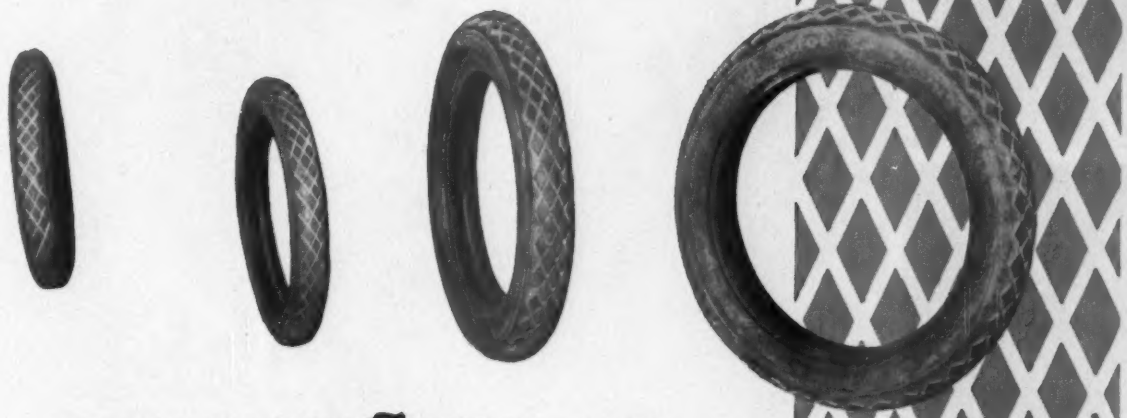
UNITED CARBON COMPANY, INC.

CHARLESTON 27, W. VA.

NEW YORK AKRON CHICAGO BOSTON

CANADA: CANADIAN INDUSTRIES, LTD.

REMEMBER THIS TREAD?



IT IS THE GOODYEAR ORIGINAL ALL-WEATHER PASSENGER TIRE TREAD

Rubber industry people — and many motorists, too — will remember the first "All-Weather" . . . Its characteristic "diamond" tread design marks a Goodyear Tire, even today. Yet it was nearly half a century ago that the "All-Weather" made its bid for enduring fame by bringing greater safety and comfort to motoring.

It was nearly half a century ago, too, that the Bridgwater Machine Company began manufacturing tire molds . . . Since 1906 Bridgwater has regularly produced for the tire industry, molds of highest quality materials, precision-made by metal-working craftsmen of long experience. And from these Bridgwater-built molds have come many of the Nation's most famous tires.

Our Athens Machine Division, in Athens, Ohio, is, we believe, the only plant in the world devoted exclusively to tire mold manufacture. Here, specialized machinery and special machine tools — many of our own design — are concentrated to expedite mold-making efficiently and precisely. Construction is now under way to expand even these ample facilities with additional space and tools.

At Athens, Bridgwater craftsmen focus their skills, unhampered, on their sole job of making automotive tire molds of any type or size . . . in steel, cast iron or aluminum — at decidedly favorable cost.

1739

ATHENS MACHINE DIVISION

THE BRIDGWATER MACHINE COMPANY

Akron, Ohio

HERE'S WHAT CAN HAPPEN when you overload your control equipment beyond its maximum interrupting capacity. Luckily this was a test under regulated conditions . . . but this (inset) is what could happen to your equipment with inadequate interrupting capacity in your control.

Protect your costly equipment with High Voltage G-E Limitamp Control

interrupting capacity up to 250,000 kva

Don't take chances on inadequate interrupting capacity. Be sure you have the right controls to protect your equipment and personnel against the possibility of sudden and destructive electrical overloads.

For complete protection against short-circuit conditions up to 250,000 kva specify G-E Limitamp Control, a high voltage motor starter (to 4800 volts) for motors up to 2250 hp.

G-E Limitamp is easy to maintain, simple to operate. Parts can be inspected at a glance . . . fuses are easily accessible in a protected compartment . . . push-button operation permits manual starting and stopping . . . equipment stands up for years under tough conditions.

G-E engineers study your requirements . . . design all components into a co-ordinated "package" that will give you adequate interrupting capacity for your system.

For complete information contact your nearest G-E representative or write for Bulletin GEA-5409A, General Electric Company, Section 781-4, Schenectady 5, New York.

G-E Limitamp Control

You can put your confidence in—

GENERAL ELECTRIC

Glidden

CADMOLITH* COLORS...

give extra performance for these 8 reasons:

Glidden leadership in pigment research has produced in Cadmolith Colors a combination of advantages found in no other red or yellow pigments. These colors are now adding new sales appeal and lasting beauty to an amazing variety of products . . . available for prompt shipment!

*Trade-Mark Reg. U. S. Pat. Off.

- ✓ Soft and Easy to Grind
- ✓ Insoluble in all Vehicles
- ✓ Alkali and Acid Resistant
- ✓ High Heat Resistance
- ✓ Non-Fading to Light
- ✓ Non-Bleeding
- ✓ Wide Range of Shades
- ✓ Opaque

QUALITY Glidden PRODUCTS

The Glidden Company

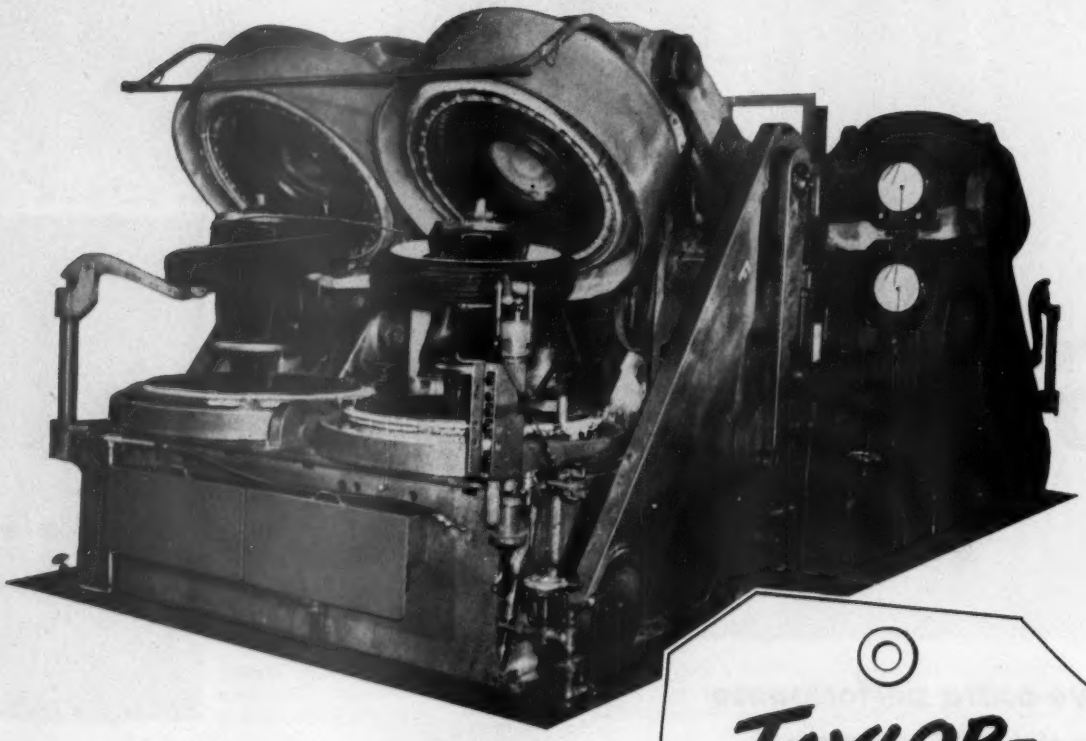
CHEMICALS • PIGMENTS • METALS DIVISION

Baltimore, Md. • Collinsville, Ill. • Hammond, Ind. • Oakland, Calif.

Send for this folder

giving complete details, with color chips. Write The Glidden Company, Chemicals • Pigments • Metals Division, Union Commerce Building, Cleveland 14, Ohio.

New Bag-O-Matic Press
saves space and time



THE NEW McNeil Bag-O-Matic Press combines these complicated operations into one simple process by: **(1)** automatically controlling time and temperature during curing **(2)** automatically "bagging" before vulcanizing and "debagging" after vulcanizing **(3)** and automatically opening the press. When delivered "Taylor-Equipped", as most of them are, they are masterminded by a Taylor FLEX-O-TIMER* Time Cycle Controller, two Taylor Double Duty FULSCOPE* Recording Controllers, and a Taylor Pressure Recorder.

FLEX-O-TIMER (*on back side*) automatically controls sequence and duration of all functions from closing to opening of press. Double Duty FULSCOPE Controllers (*right*) control press temperature and condensate removal in each cavity. Taylor Bi-Record Pressure Gage (*right, below*) records bag pressure to each press.

Whatever product you want to make, Taylor can control your process at low cost. To keep quality up and costs down, ask your Taylor Field Engineer! Taylor Instrument Companies, Rochester, N. Y., and Toronto, Canada.

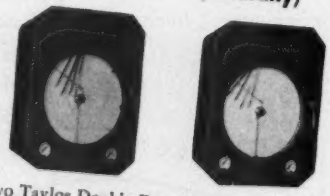
Instruments for indicating, recording and controlling temperature, pressure, flow, liquid level, speed, density, load and humidity.

*Registered Trade-Mark

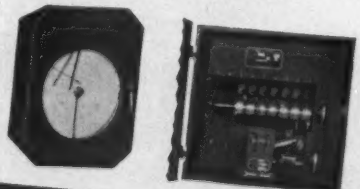
TAYLOR INSTRUMENTS MEAN ACCURACY FIRST

TAYLOR-EQUIPPED

(naturally)



Two Taylor Double Duty FULSCOPE Recording Controllers (*above*) and Taylor Bi-Record Pressure Gage and Flex-O-Timer Time Cycle Controller (*below*) standard-equipped on the new McNeil Bag-O-Matic Press.



A MATTER OF DOLLARS AND SENSE!

calcene tm · calcene nc

Now that the price of comparable grades of natural rubber is approaching that of GR-S, compounders will want to review ideas on appropriate formulation changes.

For color-sensitive white or pastel stocks, Calcene NC should be on your evaluation list. This new, white, non-coated calcium carbonate offers a level of properties, ease of production, and economies most needed in today's competitive market.

Where color problems are not so critical, Calcene TM will do a superior job of reinforcement. The coating agent used offers easier dispersion and makes Calcene TM your best value in the fine particle calcium carbonate field.

In general compound development, the *delivered volume cost* of Calcene TM or Calcene NC and properties similar to those with medium and fine thermal blacks may suggest further cost savings. Both grades of Calcene will also provide reinforcement equivalent to the finest particle calcium carbonates at considerably reduced expense.

We suggest that you review again Data Bulletin 52-4, or if you do not have a copy, consult our nearest office for the data and price information.

PHYSICAL PROPERTIES OF THESE EXCLUSIVE COLUMBIA-SOUTHERN PIGMENTS

	CALCENE TM	CALCENE NC
Average Particle Size	0.1 Micron	0.1 Micron
Specific Gravity	2.5	2.7
Wet Screen Test (on 325 mesh)	0.1% Max.	0.1% Max.
Color	Very Light Cream	White
Coating Agent	3.25-4.0%	—
Moisture	0.6% Max.	0.6% Max.
Oil Absorption	30-40	40-50

COLUMBIA-SOUTHERN
CHEMICAL CORPORATION
SUBSIDIARY OF PITTSBURGH PLATE GLASS COMPANY
FIFTH AT BELLEFIELD, PITTSBURGH 13, PA.

DISTRICT OFFICES: BOSTON • CHARLOTTE • CHICAGO • CINCINNATI • CLEVELAND • DALLAS • HOUSTON • MINNEAPOLIS
NEW ORLEANS • NEW YORK • PHILADELPHIA • PITTSBURGH • ST. LOUIS • SAN FRANCISCO

BURGESS SUN RESISTOR #1150

for TIRE COMPOUNDING

SUN RESISTOR #1150 is used in substantial quantities in tire compounding, mechanical goods, insulated wire and cable compounds, and other rubber goods.

- **Recommended Usage: 2-4% of the weight of the rubber hydrocarbon, depending on the degree of protection desired.**
- **Unlimited availability.**
- **Low cost.**
- **Available in convenient slabbed forms.**

Ask your Burgess representative for technical data, working samples, and prices.

Burgess Pigment COMPANY

EXECUTIVE SALES OFFICES: 64 HAMILTON ST., PATERSON 1, N. J.
WAREHOUSES: TRENTON, NEW JERSEY • SAYLESVILLE, RHODE ISLAND • AKRON, OHIO • LOS ANGELES, CALIFORNIA

HYDROUS AND ANHYDROUS ALUMINUM SILICATE PIGMENTS, KAOLIN CLAYS, "ANTISUN" SUN CHECKING AGENT, PLASTICIZERS, RECLAIM PROCESSING OILS, GILSONITE COMPOUNDS, CURE ACTIVATORS.

Produced by **HYDROXLYATION** a new process for chemically modifying fats and oils

NEW

COMMERCIALLY AVAILABLE

PLASTICIZERS

- CELLULOSIC RESINS
- SYNTHETIC RUBBER
- VINYL RESINS

ESTANOX 203
Butyl Hydroxy-Acetoxy Ester

ESTANOX 206
Butyl Polyacetoxy Ester

PERFORMANCE ADVANTAGES

GOOD COMPATIBILITY
Excellent solubilizing characteristics imparted by controlled introduction of hydroxy and acetoxy groups.

LOW VOLATILITY
Chain length and high molecular weight guarantee good permanence.

EXCELLENT IMPARTED FLEXIBILITY
Planned chemical structure specially designed for high plasticizing efficiency.

FREEDOM FROM RANCIDITY
Low iodine value, less than 20, assures oxidation stability.

Mail convenient coupon for samples and technical data sheets. Please clip to your letterhead.

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LOS ANGELES • CHICAGO

The Baker Castor Oil Company RA-53
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Please send sample of ☐ 203; ☐ 206; also data sheets with physical and chemical characteristics.

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YOU who work with Banbury Mixers, and are charged with their maintenance, and the efficient flow of production, know first hand the task it is to overcome the wear caused by steady use.

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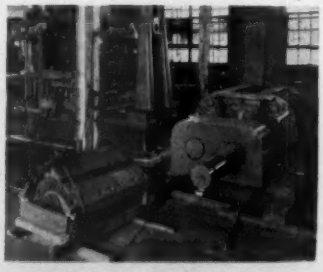

Now more than ever you can benefit from Interstate's seventeen years specialized experience in rebuilding and hard-surfacing Banbury bodies. Write for details and prices. One of our engineers will call at your plant and inspect your installation at your request.

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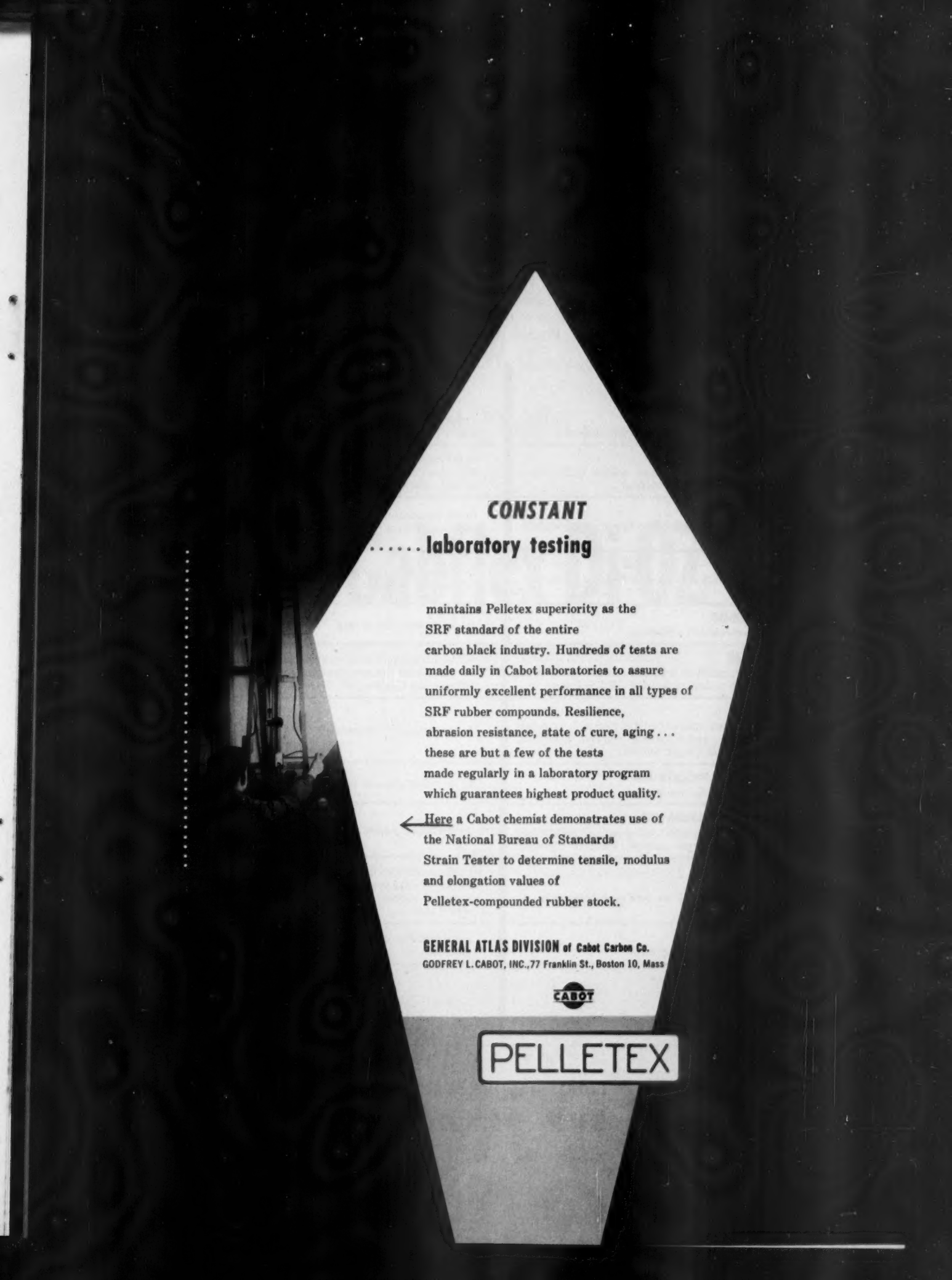
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..... laboratory testing
maintains Pelletex superiority as the SRF standard of the entire carbon black industry. Hundreds of tests are made daily in Cabot laboratories to assure uniformly excellent performance in all types of SRF rubber compounds. Resilience, abrasion resistance, state of cure, aging . . . these are but a few of the tests made regularly in a laboratory program which guarantees highest product quality.
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PELLETEX

Get Better Physicals and Lower Costs with These Sun Process Aids

In compounding and processing natural and synthetic rubbers, you can depend on the quality of these Sun "Job Proved" Products. And there's a Sun Rubber Process Aid to satisfy your every requirement.

PRODUCT	WHERE YOU CAN USE IT
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CIRCOSOL-2XH An elasticator composed of special hydrocarbon structures derived from petroleum.	In the manufacture of oil-extended polymers. As a plasticizer and softener for compounding GR-S polymers, natural rubber and combinations of the two.
CIRCOMAR-5AA A free-flowing, dark liquid softener of the asphalt-flux type.	In the manufacture of tires of natural rubber, GR-S polymers, or blends of these two.
CIRCOMAR-25 A heavy, viscous, dark liquid softener of the asphalt-flux type.	In the manufacture of tires of natural rubber, GR-S polymers, or blends of these two.
CIRCOMAR-110 A very low-cost soft asphaltum.	In the manufacture of tires.
SUNDEX-53 A low-cost, relatively aromatic product highly compatible with natural rubber and GR-S polymers.	In the manufacture of oil-extended polymers. In the processing of tires, rubber footwear, matting, toys, semihard rubbers, etc. In extending high Mooney viscosity Neoprene WHV.
SUNDEX-41 A complex dark-colored blend of high mol. wt. petroleum fractions and a specially prepared asphaltum, all derived from selected sources.	For processing "cold rubber."
516 RUBBER PROCESS AID A highly paraffinic type product.	In the manufacture of butyl inner tubes.
PDO 40 RECLAIMING AID A dark-colored product composed of polymerized olefinic hydrocarbons generally cyclic in character.	As a reclaiming agent.
SUNAPTIC ACID A saturated high mol. wt. type naphthenic acid.	In Neoprene latex compounds to eliminate irregularities in the surface of coagulated dip films. As an activating agent in the curing of rubber. May be used as a direct replacement for stearic acid.
SUNOCO ANTI-CHEK A tailor-made petroleum wax.	For protecting rubber from surface cracking caused by sunlight, ultraviolet light, ozone.
SUNOCO WAXES 1290 Yellow 1290 Brown Carefully refined microcrystalline waxes having a melting point of about 180 F.	As mold releasing agents.

For information on these process aids or Sun's "Job Proved" lubricants for rubber-process machinery call your nearest Sun Office or write SUN OIL COMPANY, Phila. 3, Pa., Dept. RA-5.

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for VINYL PLASTIC COMPOUNDS

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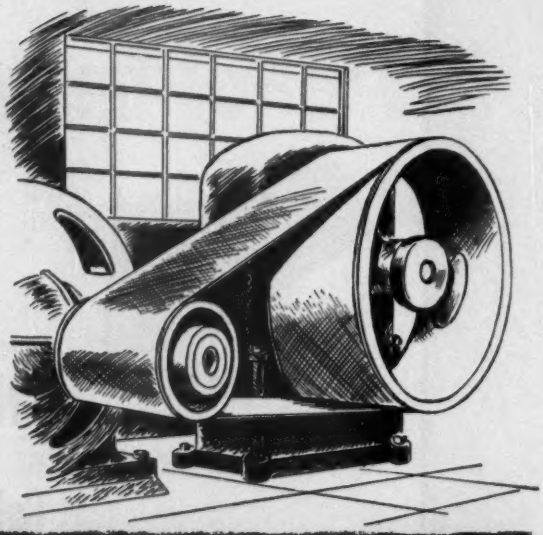
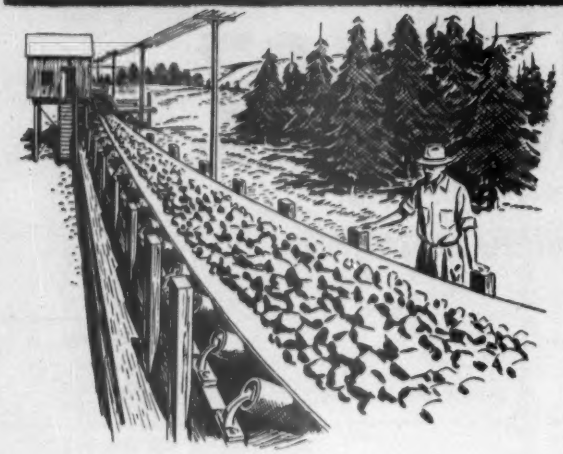
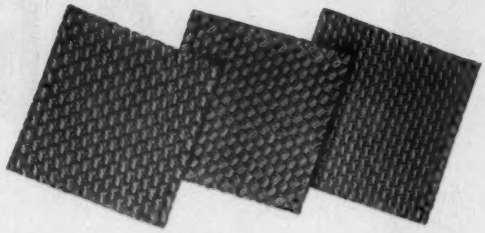
Cabot produces the "Cabflex" plasticizers and does not make the finished product



If it's got to do a SPECIAL job...





make it a Wellington Sears "fiber-engineered" fabric

In addition to its dependable line of sturdy, versatile cotton fabrics for the rubber industry, Wellington Sears has developed many new fabrics which utilize the special advantages of modern synthetic fibers, alone or in combination with cotton. High tenacity rayon fabrics, for instance, give new strength and lightness to low-gauge belts. Cotton-nylon and rayon-nylon combinations provide improved troughing qualities for conveyor belts. Rugged constructions of nylon, nylon-rayon and nylon-cotton make excellent breaker fabrics for heavy duty belts.

Whatever the application . . . whether it be a tough rayon reinforcement to make light, easily-handled steam hoses with minimum bursting hazard . . . or flexible, flex-resistant nylon or rayon cloth for pump and air compressor diaphragms . . . for these and many other problems, Wellington Sears can provide the answer with fabrics "fiber-engineered" and designed to meet specific mechanical requirements.

An abbreviated list of fabrics for the rubber industry is at the right. Your nearest Wellington Sears office will supply you with complete information.

An illustrated 24-page booklet filled with valuable facts on fabric development and applications of interest to present and potential users of industrial fabrics is yours for the asking. Write for a free copy of "Modern Textiles for Industry" to Wellington Sears Co., Dept. L-3, 65 Worth Street, New York 13, N. Y.

Superior Fabrics for the Rubber Industry

Belting duck
Hose duck
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Single and plied-yarn chafers
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Airplane cloth
Balloon cloth
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AZO-ZZZ-44 and AZO-ZZZ-55 assure good dispersion and easy processing because of their uniform particle size and absence of extreme fines. With AZO-ZZZ-11, 22, 33, (Acicular types) and special grades, a complete range of zinc oxides is offered for every rubber requirement.

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A RELIABLE SOURCE

American Zinc assures an uninterrupted supply of zinc oxide. Recent discovery and development of a new, large ore body, added to previous American Zinc reserves, provides sufficient ore to last many years at the current rate of production.

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. . . and cut mold maintenance costs by as much as 80%

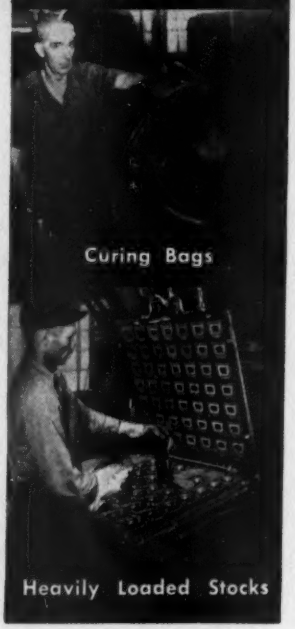
Inspector Mike used to fill the scrap bins when white or light-colored parts were running. But Moe Muscles has put an end to all that with Dow Corning silicone release agents. Brilliantly clean and free from surface blemishes, even white parts leave the mold unstained by carbonized lubricants or mold dirt.

That's because Dow Corning silicone mold lubricants can't break down to form a carbonaceous deposit on mold surfaces. Molds stay clean 5 to 20 times longer than they do with ordinary release agents. Sharp detail, closer tolerances and high surface finish are assured — even on heavily loaded stocks. And mold maintenance costs are reduced by as much as 80%.

For easier release, lower production costs, improved quality and better appearance, specify Dow Corning silicone release agents: fluid for green carcass, bead and parting line release; emulsions for molds, mandrels and curing bags.

For lower costs specify DOW CORNING SILICONE RELEASE AGENTS

Deep Cavity Molds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One of a series of comprehensive laboratory controls throughout production to assure uniformity in all Mt. Vernon-Woodberry products. Here yarn number is being determined with Suter Scales.

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Need adaptation of an existing fabric to your special purposes? Or creation of an entirely NEW fabric —cotton, synthetic or blend — to meet your specifications? Mt. Vernon-Woodberry's staff of textile engineers is available on request to help you with your problems in development or application of industrial fabrics.

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and Clean as a Whistle!

Western's RMH Machine

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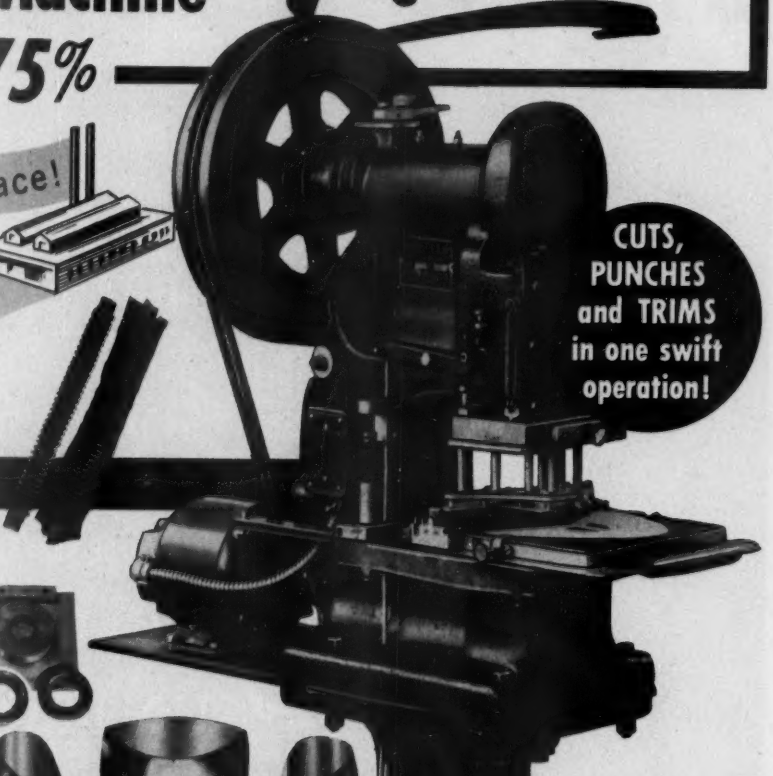
a factory in a foot of space!

FEATURES: Cuts on replaceable hardened steel plate. Foot control speeds operation. Simple, positive pressure adjustment. ½ H.P. motor Cutting area approx. 8½" x 9".



CUTS, PUNCHES and TRIMS in one swift operation!

DIES ARE OUR SPECIALTY

2 and 3 level dies are made for RMH. Change dies in just a few seconds with positive alignment.

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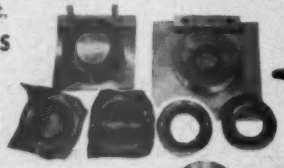
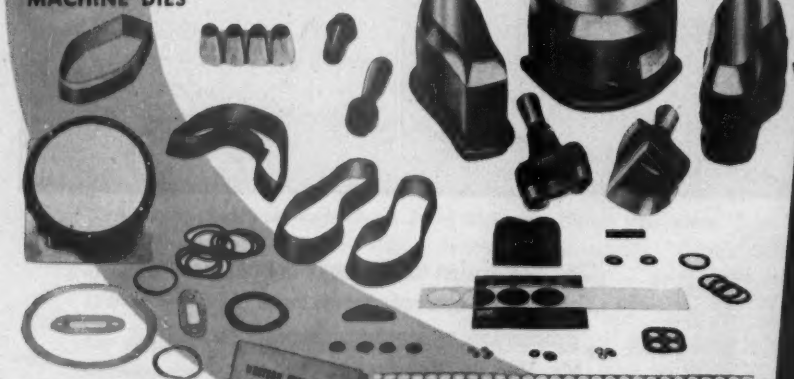
- I. D. and O. D. DIES
- MALLET DIES
- MACHINE DIES





POSITIVE SAFETY FEATURES

Machine *cannot* trip accidentally. Operator can view entire operation.

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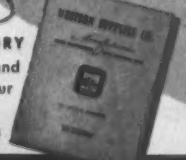

SEND SAMPLES of parts to be cut and flash trimmed for our recommendations.

For Versatility- "Go Western"

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for better working conditions . . .

Calco MBTS scores high in low dusting!

Settle your dusting problems once and for all with CALCO MBTS. It contains an effective dedusting agent . . . and a lubricant to assure good dispersion.

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Calco MBTS scores high in low dusting!

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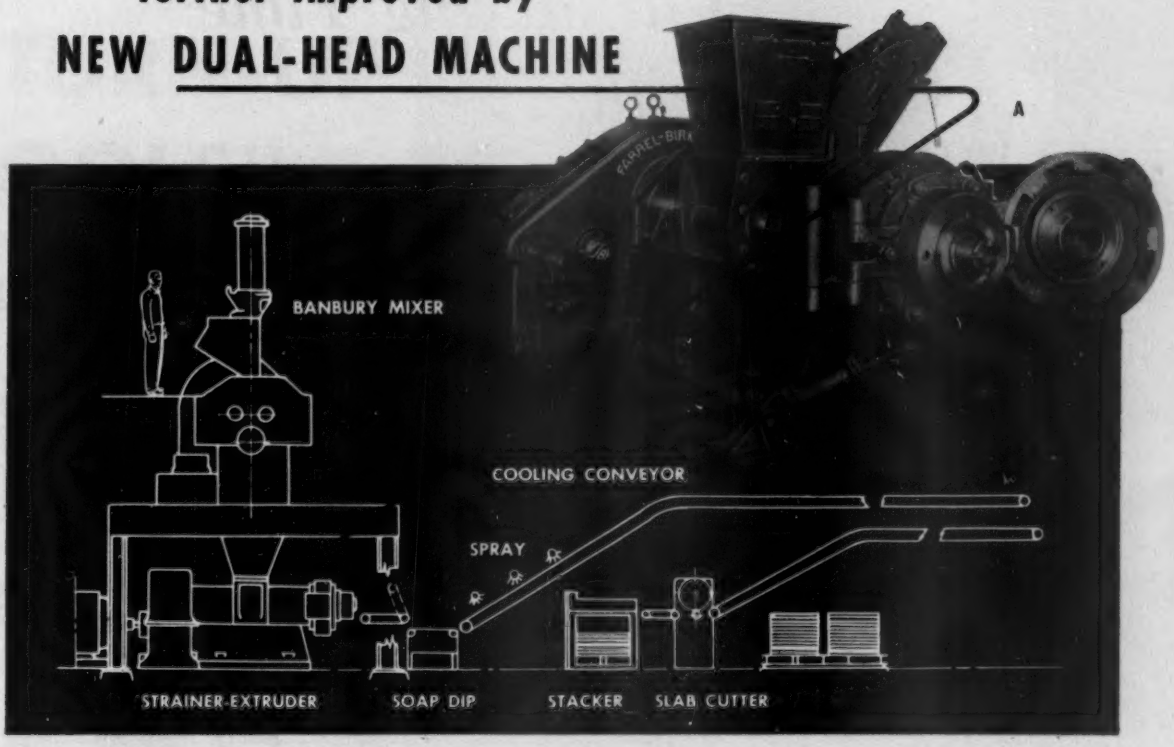
see reverse side

STRAINER-EXTRUDER SYSTEM
further improved by
NEW DUAL-HEAD MACHINE



Three years ago, Farrel-Birmingham announced the development of the strainer-extruder system shown in the above diagram. Now, with a new dual-head machine available as optional equipment, the system becomes even more versatile and efficient.

In this system, the combination strainer-extruder takes the Banbury batch (either direct from the mixer or by conveyor), strains it or extrudes it, or both. With a cooling conveyor incorporating a dip unit, slab cutter and stacker, material from the Banbury* mixer is automatically strained, extruded, soaped and stacked in neat piles.

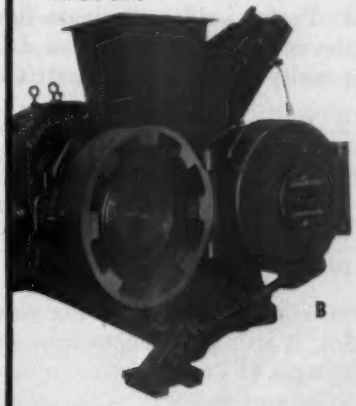
The two or three men required by a conventional system are no longer needed. The Banbury operator controls the entire process. Not a pound of stock is lifted or carried manually.

The new strainer-extruder has two hinged heads of breechlock construction which are hydraulically operated to make changeover easier. One head is for straining and has a circular die to deliver the stock in a tube which is slit at the die exit to form a continuous slab of the stock. The second head extrudes the stock as a flat strip, without straining.

Farrel-Birmingham extruders are built, either with or without strainers, in sizes to handle the output of any production size Banbury mixer. These machines, although similar in general features, are specially designed to suit your exact requirements.

Send for further information about extruders to meet your exact needs, or for complete details of the Farrel-Birmingham strainer-extruder system.

A (Above) New dual-head strainer-extruder with combination straining and circular die extruding head in position. Stock is strained and then extruded in a tube, which is slit at the die exit.



B Here the strainer head has been swung out of the way, and the flat strip extruder head placed in position.

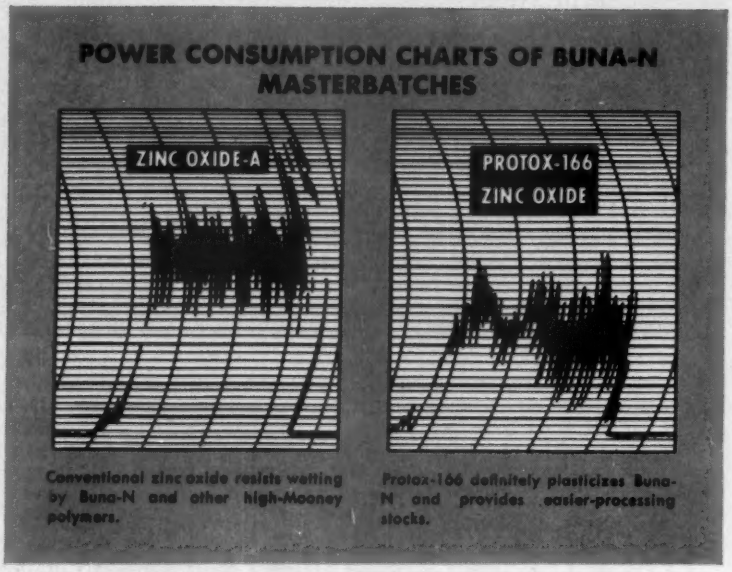
FARREL-BIRMINGHAM COMPANY, INC.
ANSONIA, CONNECTICUT
Plants: Ansonia and Derby, Conn., Buffalo, N. Y.
Sales Offices: Ansonia, Buffalo, New York, Akron, Chicago, Los Angeles, Houston FB-828

Farrel-Birmingham®

*Trade mark of Farrel-Birmingham Co., Inc.

Save on Power Costs Cut Mixing Time with . . .

PROTOX* *Zinc Oxides*


POWER CONSUMPTION CHARTS OF BUNA-N MASTERBATCHES
ZINC OXIDE-A
PROTOX-166 ZINC OXIDE
Conventional zinc oxide resists wetting by Buna-N and other high-Mooney polymers.
Protox-166 definitely plasticizes Buna-N and provides easier-processing stocks.

These wattmeter records, made on our laboratory Banbury, show how Protox oxides cut power costs of zinc masterbatching and shorten mixing time as compared with conventional oxides:

1. Protox oxides eliminate Banbury power peaks. Rubber's affinity for the coated Protox surfaces does away with power surges—thus cutting penalty payments for electricity beyond the contract demand limit.

2. Protox oxides use less power per batch. Their patented coating of zinc propionate plasticizes the rubber . . . makes mixing easier.

3. Protox oxides shorten mixing time. They have fewer aggregates . . . the latter are dispersed by our exclusive process——treatment with propionic acid.

These are only a few of the ways you save processing dollars with Protox oxides. It will pay you to take in a trial order now and count up all the advantages of Protox under your particular conditions.

*U. S. Patents 2,303,329 and 2,303,330

THE NEW JERSEY ZINC COMPANY

Producers of Horse Head Zinc Pigments

. . . most used by rubber manufacturers since 1852

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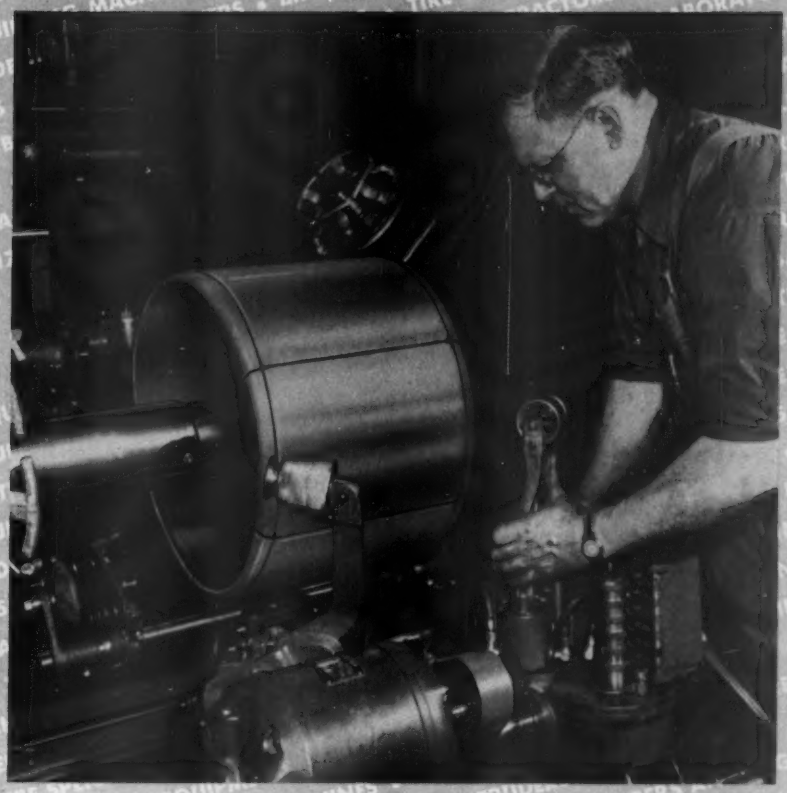
HORSE HEAD PRODUCTS

"TURN-UP TOOLS" ARE *CUSTOM BUILT* ON NRM



TIRE BUILDING MACHINES

The NRM Tire Building Machine above is a standard model . . . yet it is *custom-built!* The turn-up tools on this — and on all NRM Tire Building Machines — are specially made to meet the manufacturing requirements of the customer's particular type of tires, and so the machine will work in perfect accord with the production equipment existing in his plant.

From experience, the rubber industry knows that NRM's quarter-century of *creative engineering* has produced the most practical *basic* designs in rubber processing equipment. It knows, too, that every NRM machine is *custom* constructed, fitted and adjusted to give it top performance in a rubber production setup . . . to make it increase the "flow" of production in that plant.

2736

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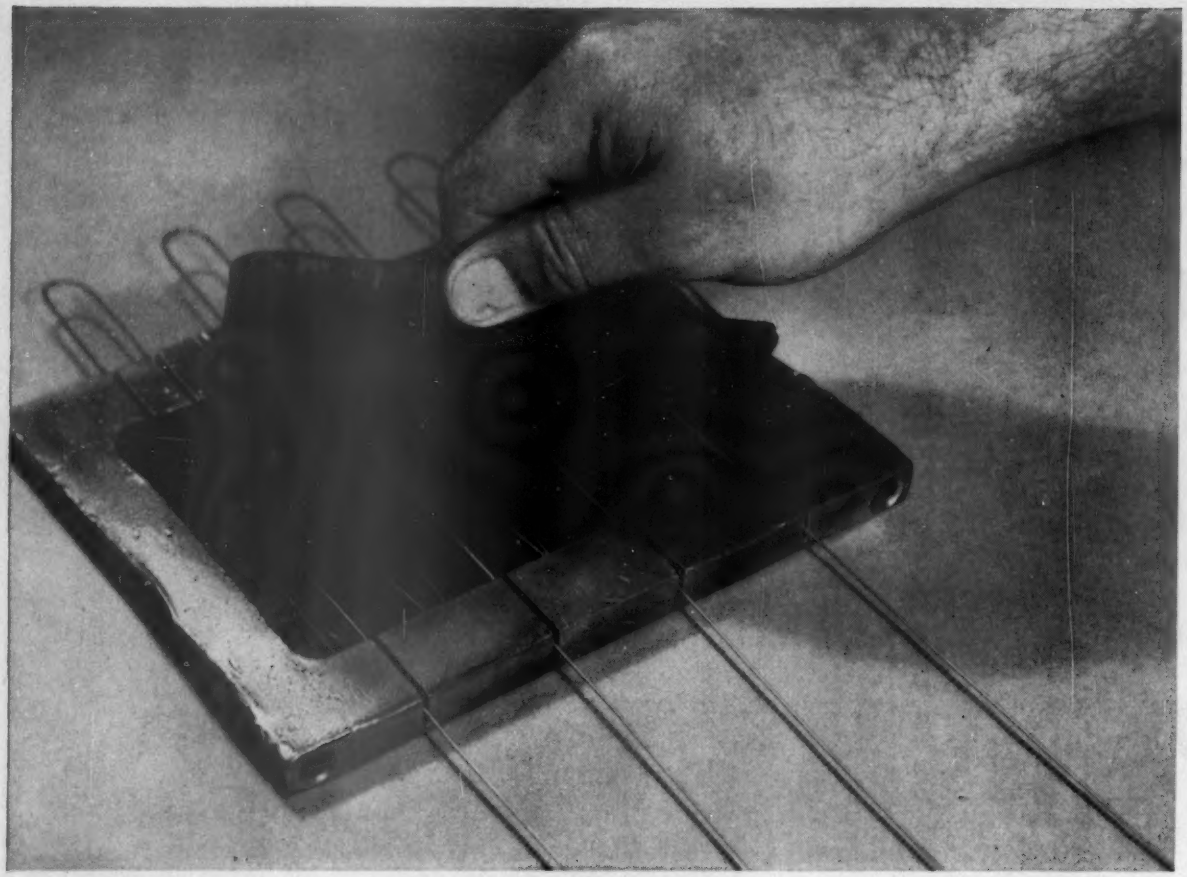

How we use pull...

to help your wire do a better job!

● It doesn't pay to take things for granted. That's why extensive wire research goes on *all* the time at National-Standard — behind-the-scenes work that time and again helps our customers speed operations, save material, improve their products and cut costs.

The lab test being rigged above, for example, will reveal the rubber adhesion qualities of a newly developed wire finish. After the rubber layers are vulcanized, carefully recorded pull will be exerted on the imbedded wire until it finally breaks loose. Only by such painstaking test work can you be assured of new, improved qualities and characteristics that will let you make the *most* of wire.

Whatever use you make of wire—in rubber products, or anything from bottle caps to zither strings —keep in mind that National-Standard's facilities, experience and "groundwork" are always ready to help you put wire to work with the *greatest* efficiency at the *lowest* cost.

NS NATIONAL-STANDARD Company NILES, MICHIGAN

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For better age-resistance in natural and synthetic rubber

WITCO SUNOLITE® WAX

SUNOLITE WAX is made in WITCO's Chicago plant.

- ★ Lighter in color than other anti-suncheckings waxes. No adverse effect on white or pastel stocks.
- ★ Equal or superior to other waxes as an inhibitor of static atmospheric and corona cracking. Tests show 3 to 5 parts Sunolite per 100 parts GR-S 100% effective after 18 months' exposure!
- ★ Useful as frosting preventive . . . imparts good flex cracking resistance.
- ★ Melts and disperses readily at mixing temperatures.

Comparison tests show SUNOLITE outstanding for tire sidewalls, wire jacket and insulation, mechanicals, footwear, garden hose, automotive specialties and sundry goods.

Write today for WITCO TECHNICAL SERVICE REPORT R-7 . . . gives comparison test results and technical data.

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SAVE MONEY

on *NEW* RECLAIMATOR (Dip-Process) RECLAIMS

. . for tire treads, sidewalls, camelback, mechanical rubber goods and battery boxes.

By developing a revolutionary rubber reclaiming process, using the patented RECLAIMATOR, U. S. is now able to produce a superior type of reclaim at prices comparable to ordinary reclaims.

These new Dip-Process Reclaims are offering rubber manufacturers GREATER VALUE in THREE WAYS. First, higher abrasion resistance, better resilience and lower heat build-up give your product HIGHER QUALITY. Second, because these reclaims are easier to handle and process, YOU SAVE MONEY on manufacturing costs. Third, your material COSTS are LOWER, because less of these new Dip-Process Reclaims are required to do the same job.

With NO OBLIGATION on your part we invite you to write us for free test samples. You owe it to yourself and your company to get the facts on this newest development in the reclaimed rubber industry. Specify R-575 for tires, treads and sidewalls; R-500 for Camelback; R-805 for mechanical rubber products; R-300 for hard rubber battery boxes and R-400-NB for white sidewall tires and other non-staining applications.

Always keep reclaims in your formula and always look to U. S. for the best. U. S. Rubber Reclaiming Company, Inc., P. O. Box 365, Buffalo 5, N. Y. Trenton Agent: H. M. Royal, Inc., 689 Pennington Ave., Trenton, N. J.

70 years serving the industry solely as reclaimers

U.S. RUBBER RECLAIMING COMPANY, INC.

From Coal to Plasticizer

in 299 yards!

WHEN only a few hundred yards separate your raw materials from your finished product, you're *really* basic! That's exactly the way we produce Pittsburgh PX Plasticizers . . . in a basic and integrated operation from coke ovens, through coal chemical and phthalic anhydride plants to final shipment from our modern new plasticizer plant.

The result? Quality-controlled production every step of the way, and a broad family of thirteen plasticizers with the high standards of purity, water-whiteness and stability you want. There's a good chance our engineers will be able to help you achieve better, more efficient production at your plant. Why not call or write us about it, *today!*

PITTSBURGH PX PLASTICIZERS

PX-104 DiButyl Phthalate
PX-108 DiIsoOctyl Phthalate
PX-109 DiNonyl Phthalate
PX-138 DiOctyl Phthalate
PX-158 DiCapryl Phthalate
PX-208 DiIsoOctyl Adipate
PX-209 DiNonyl Adipate
PX-238 DiOctyl Adipate
PX-404 DiButyl Sebacate
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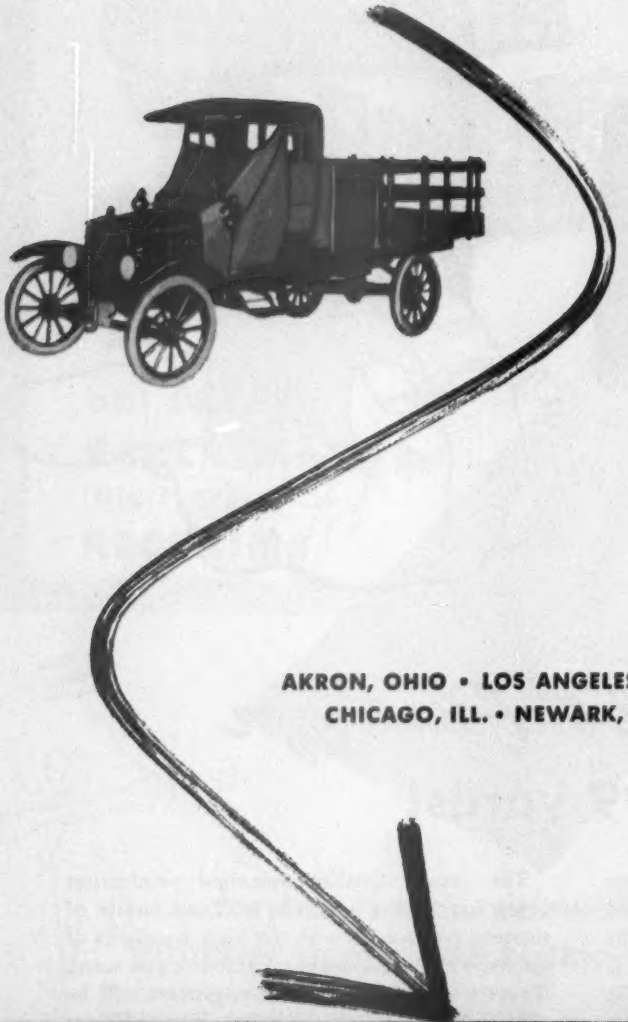

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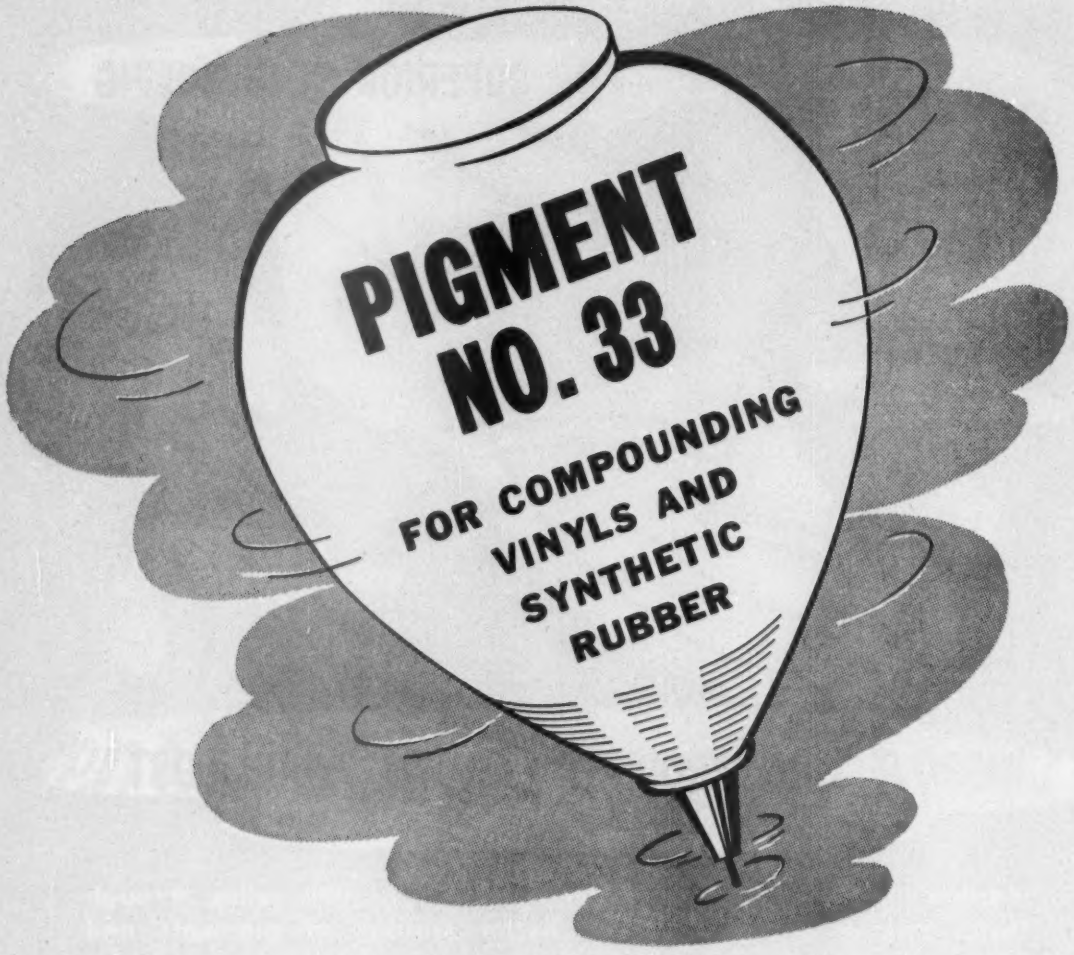

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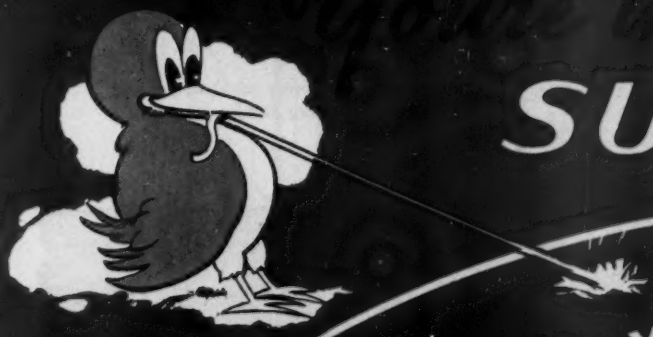

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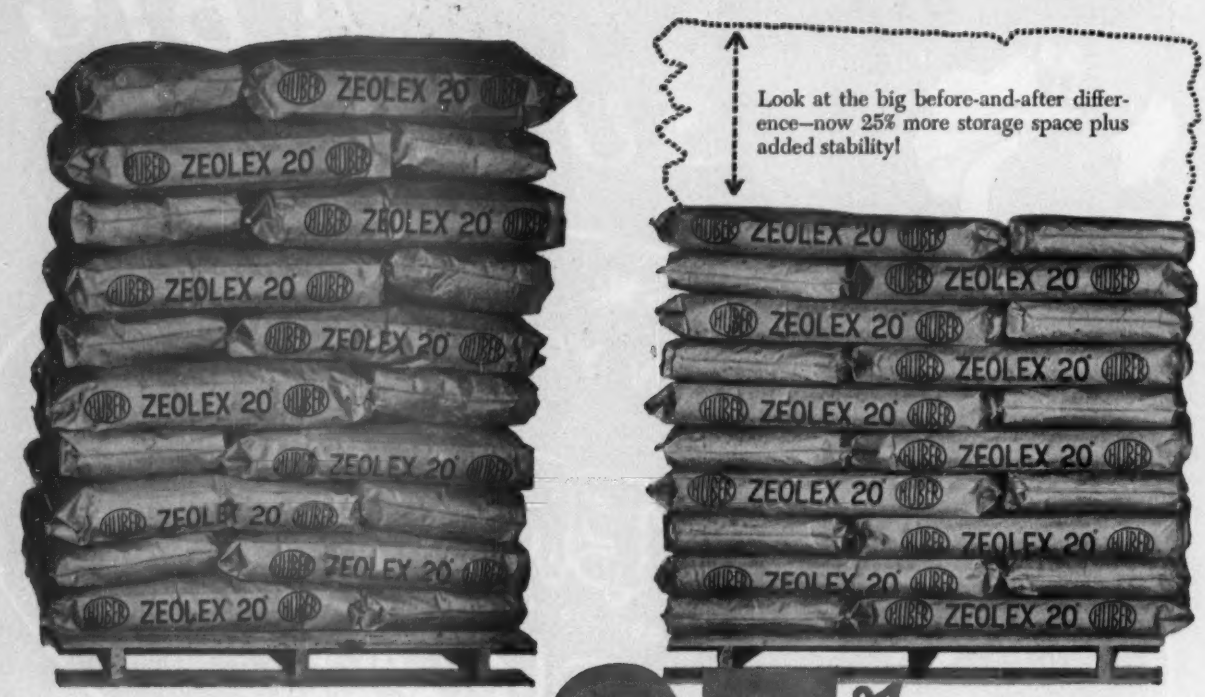

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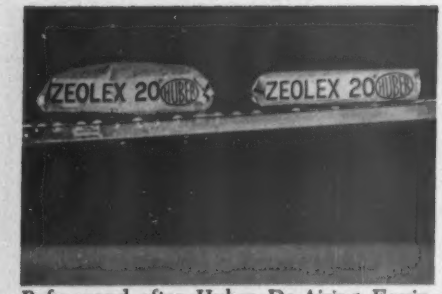

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RUBBER AGE

Vol. 73, No. 2 MAY, 1953

Measurement of Treadwear of Commercial Tires

By R. D. STIEHLER, G. G. RICHEY and J. MANDEL

National Bureau of Standards, Washington, D.C.

Studies at the National Bureau of Standards have resulted in a marked improvement in the precision and reliability of measurements of treadwear. The three principal elements in the technique responsible for this improvement are: (1) A statistical design of test which will compensate for inequality of wear on different wheels; (2) the measurement of treadwear by differential weighings, and (3) the geometric averaging of the rates of wear. The detailed procedures are described and a comparison is made of the weight and depth-of-grooves methods for determining treadwear in three road tests recently conducted. The results show that reliable estimates of tread life can be made from 4000 to 6000 miles of road test using the newly developed techniques.

THE estimation of the relative service life of tire treads ordinarily requires a road service test in which the tread is worn almost smooth. The cost of such a test prohibits its use in the Federal specification for pneumatic tires (ZZ-T-381). However, service records of tires on Government vehicles indicate that a treadwear requirement is needed in the specification.

A study of the measurement of treadwear was therefore initiated about three years ago with the object of improving the precision of test so that reliable estimates of relative service life could be obtained at a reasonable cost. In this connection, a comparison was made of the weight-loss method developed by Roth and Holt *(4)* with the customary method based on the decrease in depth of grooves in the tread design. In previous publications *(3, 6)*, such a comparison was presented for 9.00-20 tires of the same tread design using depth measurements of the center grooves only. Representatives of the tire industry requested that the study be extended to include depth measurements made on all grooves and tires of different tread designs. For this purpose, two sizes of tires were chosen, one for passenger cars and one for trucks.

This paper presents the results of three recent tests for treadwear (two on 6.50-16 tires and one on 8.25-20 tires) and describes the testing procedures currently used to measure treadwear. As in previous tests *(3, 6)*, the results show the weight-loss method to be more reliable than the depth method for determining rate of treadwear. Further, the results show that reliable estimates of the relative service life of tire treads can be obtained from a road test of 4000 to 6000 miles, provided the test is properly designed, the weight-loss method is used, and the data are analyzed by suitable methods. Treadwear tests are currently being conducted in this manner at a small fraction of the usual cost for a road test.

Design of Test

The basic function of a design or experimental plan for the testing of a number of tires to determine the rate of wear is to compensate for the unavoidable systematic errors that influence the measurements of treadwear. The influence of some factors (e.g., wheel position, vehicle, climatic conditions, etc.) is described in a previous publication *(6)*. Another function of the design is to provide sufficient replication to evaluate the reliability of the results by means of a statistical analysis of the data, and to achieve a precision of test that permits the detection of relatively small differences in rate of wear among the tires.

Latin squares *(1, 7)* have been used for the design of most tests in our studies. The simplest latin square involving a test of four tires on one vehicle is shown in Table I. It is seen that during the course of four periods each tire is tested on each wheel position. In previous publications *(3, 6)*, designs are given for testing 16 tires on four vehicles. Many other designs

Note: This paper was presented before the Rubber and Plastics Division, American Society of Mechanical Engineers, New York, N. Y., December 4, 1952.

TABLE I—DESIGN OF TEST FOR ONE VEHICLE

Period	Wheel			
	Right Front	Left Front	Right Rear	Left Rear
1	A	B	C	D
2	B	A	D	C
3	C	D	A	B
4	D	C	B	A

Note: A, B, C, and D represent four tires.

can be used including incomplete blocks, especially Youden squares *(1,7)*. The choice of the particular design to use depends on the number of tires to be tested and the number and type of vehicles available for the test.

The tests reported in this paper consist of two tests of sixteen 6.50-16 tires in each, employing 4 four-wheel drive vehicles, and one test of eighteen 8.25-20 tires employing 3 six-wheel drive vehicles. Typical designs for these tests are given in Tables II and III. The plan in Table II is subdivided into 4 sets of 4 periods each, such that each tire is run in each set on each vehicle, and on each of the 4 wheel positions. In the course of the 16 periods comprising the test, each tire is tested once on each of the 16 wheels. The plan in Table III is subdivided into 3 sets of 6 periods each, such that each tire is run in each set on each of the six wheel positions and twice on each vehicle. In the course of the 18 periods comprising the test, each tire is tested once on each of the 18 wheels. The subdivision of the plans into sets permits a reliable evaluation of relative rates of treadwear in less than the total number of sets employed in these tests and is useful for the evaluation of the reproducibility of treadwear data.

Procedure of Test

Weight Method. The procedure is essentially the same as that used by Roth and Holt *(4)*. The tires for test are mounted with inner tubes on appropriate rims. The mounted tires are weighed on the equal-arm balance shown in Figure 1. The main knife edges of the balance rest on tungsten-carbide inserts in order to avoid changes in sensitivity, which is 0.5 gram or less. However, all weighings are made to the nearest gram. The weighings are made by the constant sensitivity method, in which a tare heavier than the heaviest mounted tire is placed on one pan of the balance and the tire assembly is placed on the other pan together with sufficient weights to balance the tire. The balance point is detected by the method of swings. A periodic determination of the rest point is made by checking the tare with an equivalent known weight.

In the early tests, all weighings were made with the tires inflated. Corrections were made in the inflation pressure for changes in the ambient temperature. Since an error of ¼ pound per square inch in the adjustment of the inflation pressure results in an error of about ⅔ gram in the weight of a 6.00-16 tire to about 3 grams in the weight of a 11.00-20 tire, recent tests have been made by making all weighings with the tires deflated. In these tests, the valve core was removed to be sure that the air in the tube was at atmospheric pressure. The compressed air for inflation of the tires was filtered to remove any dirt, oil or water droplets. Before inflating the first tire, the air line was opened to blow out any condensate that might have accumulated.

Before test, passenger car and light truck tires are dynamically balanced and heavy truck tires are statically balanced. The weighings are made with the balancing weights in place. A check is made before each weighing, however, to see if any balancing weights were lost. Also, the mass of the balancing weights on each tire is determined by weighing the tire assembly before and after balancing. Thus, it is possible to determine the weight of the tire in case one or more of the balancing weights are lost.

The vehicles are loaded before each test with cast iron weights in such a manner that the same load is on each wheel. The load in most tests is the maximum recommended load of the Tire and Rim Association, Inc. Because of the limiting minimum weight of the empty vehicle, small sizes of tires are overloaded but in no case more than 15 per cent. The alignment of the wheels and the condition of the brakes are examined and any necessary corrections made prior to the test. During the course of a test, every effort is made not to disturb the alignment of the wheels, the condition of the brakes, or any other mechanical condition of the wheels. In this connection, the alignment of the wheels is checked before each period to verify that it has not changed.

The tires are placed on the vehicles in accordance with the design of test. The vehicles in each test are operated in a convoy. During each period of slightly more than 500 miles, each tire remains on the wheel to which it is allocated. At the end of the period, the tires are removed from the vehicles, stones and other foreign particles are removed from the treads, and dirt on the tires is removed by washing with water. If the tires become contaminated with road tar, it is removed with gasoline. After washing, the surplus water is removed with compressed air and the tires are allowed to dry at least 16 hours before they are deflated and weighed.

As a control, the spare tire on each vehicle is treated in the same manner as the tires being tested. The weight of the spare tire remains essentially constant except when most of the period is wet (transient showers do not cause any difficulty). Even under these conditions, the

FIG. 1—Equal-arm balance used to weigh tires. A fixed weight is placed on the right pan, and the tire plus sufficient metric weights to balance the fixed weight is placed on the left pan.

weight of the spare tires remains fairly constant when mounted on full drop-center rims. However, tires mounted on truck rims increase in weight indicating that water has gotten into them. When this condition occurs, the tires are deflated and dried in a room maintained at 100° F. until the spare tires return to the correct weight (generally 48 hours). The drying is sometimes accelerated by passing filtered compressed air between the rim and the tire. This difficulty in wet weather is the principal disadvantage of the weight method. (NOTE: Since the original text was written, the following procedure has been adopted for conditioning tires before weighing: After the tires are removed from the vehicles and cleaned at the end of each test period, they are deflated and placed in a room maintained between 100° and 110° F. for a period of 40 hours. If the roads were wet during the test period, filtered compressed air is injected through the valve hole or slot in the rim during the drying period. Before the tires are weighed initially, they are also placed in the drying room for a period of 40 hours. This procedure has eliminated the principal difficulties generally encountered in wet weather.)

If a puncture occurs on the road, the mileage is recorded and the tire is replaced with the spare until the vehicle returns to the testing station where the object causing the puncture is removed. The punctured tire after complete deflation is weighed. The tube is removed and repaired or replaced depending on the extent of the damage. After remounting the tire with the valve stem of the tube in the same relative position as before the puncture, the assembly is again weighed. The difference in weight before and after repair is applied as a correction in determining the total weight of the tread. When it is necessary to replace the tube, the tire is rebalanced and appropriate corrections are made for any change in the mass of the balancing weights. If a tire is damaged beyond repair (which did not occur in any of the tests in this paper), a duplicate tire is substituted for the one that failed and the test continued; if necessary, the period in which failure occurred is repeated.

After the road test is completed, the remaining tread is removed by buffing to determine the total weight of tread. A specially designed machine shown in Figure 2 is used. It has adjustments for buffing to any tread radius between 6 and 13 inches, to any tread depth on tires between 6.00-16 and 11.00-20 in size, and for centering the different sizes of tires with respect to the buffing wheel. Each tread is buffed to the tread radius that existed at the end of the road test. The tread is removed in such a manner that the depth of the two outside grooves are equal even though one shoulder may have worn faster than the other during the road test. Buffing is terminated when anyone of the tread grooves disappears for 180 degrees around the circumference of

TABLE II—DESIGN OF TEST FOR 4 FOUR-WHEEL VEHICLES

Set	Period	Axle	Vehicle 1 Left	Vehicle 1 Right	Vehicle 2 Left	Vehicle 2 Right	Vehicle 3 Left	Vehicle 3 Right	Vehicle 4 Left	Vehicle 4 Right
1	1	Front	A	B	C	D	E	F	G	H
		Rear	I	J	K	L	M	N	O	P
	2	Front	K	L	I	J	O	P	M	N
		Rear	C	D	A	B	G	H	E	F
	3	Front	F	E	H	G	B	A	D	C
		Rear	N	M	P	O	J	I	L	K
	4	Front	P	O	N	M	L	K	J	I
		Rear	H	G	F	E	D	C	B	A
2	5	Front	L	K	J	I	P	O	N	M
		Rear	D	C	B	A	H	G	F	E
	6	Front	B	A	D	C	F	E	H	G
		Rear	J	I	L	K	N	M	P	O
	7	Front	O	P	M	N	K	L	I	J
		Rear	G	H	E	F	C	D	A	B
	8	Front	E	F	G	H	A	B	C	D
		Rear	M	N	O	P	I	J	K	L
3	9	Front	M	N	O	P	I	J	K	L
		Rear	E	F	G	H	A	B	C	D
	10	Front	G	H	E	F	C	D	A	B
		Rear	O	P	M	N	K	L	I	J
	11	Front	J	I	L	K	N	M	P	O
		Rear	B	A	D	C	F	E	H	G
	12	Front	D	C	B	A	H	G	F	E
		Rear	L	K	J	I	P	O	N	M
4	13	Front	H	G	F	E	D	C	B	A
		Rear	P	O	N	M	L	K	J	I
	14	Front	N	M	P	O	J	I	L	K
		Rear	F	E	H	G	B	A	D	C
	15	Front	C	D	A	B	G	H	E	F
		Rear	K	L	I	J	O	P	M	N
	16	Front	I	J	K	L	M	N	O	P
		Rear	A	B	C	D	E	F	G	H

Note: The letters A through P represent the 16 tires included in the test.

TABLE III—DESIGN OF TEST FOR 3 SIX-WHEEL VEHICLES

Set	Period	Axle	Vehicle 1 Left	Vehicle 1 Right	Vehicle 2 Left	Vehicle 2 Right	Vehicle 3 Left	Vehicle 3 Right
1	1	Front	A	B	C	D	E	F
		Center	G	H	I	J	K	L
		Rear	M	N	O	P	Q	R
	2	Front	B	A	D	C	F	E
		Center	H	G	J	I	L	K
		Rear	N	M	P	O	R	Q
	3	Front	Q	R	M	N	O	P
		Center	E	F	A	B	C	D
		Rear	K	L	G	H	I	J
	4	Front	R	Q	N	M	P	O
		Center	F	E	B	A	D	C
		Rear	L	K	H	G	J	I
	5	Front	I	J	K	L	G	H
		Center	Q	P	Q	R	M	N
		Rear	C	D	E	F	A	B
	6	Front	J	I	L	K	H	G
		Center	P	Q	R	Q	N	M
		Rear	D	C	F	E	B	A
2	7	Front	E	F	A	B	C	D
		Center	K	L	G	H	I	J
		Rear	Q	R	M	N	O	P
	8	Front	F	E	B	A	D	C
		Center	L	K	H	G	J	I
		Rear	R	Q	N	M	P	O
	9	Front	Q	P	Q	R	M	N
		Center	C	D	E	F	A	B
		Rear	I	J	K	L	G	H
	10	Front	P	Q	R	Q	N	M
		Center	D	C	F	E	B	A
		Rear	J	I	L	K	H	G
	11	Front	G	H	I	J	K	L
		Center	M	N	Q	P	Q	R
		Rear	A	B	C	D	E	F
	12	Front	H	G	J	I	L	K
		Center	N	M	P	Q	R	Q
		Rear	B	A	D	C	F	E
3	13	Front	C	D	E	F	A	B
		Center	I	J	K	L	G	H
		Rear	Q	P	Q	R	M	N
	14	Front	D	C	F	E	B	A
		Center	J	I	L	K	H	G
		Rear	P	Q	R	Q	N	M
	15	Front	M	N	Q	P	Q	R
		Center	A	B	C	D	E	F
		Rear	G	H	I	J	K	L
	16	Front	N	M	P	Q	R	Q
		Center	B	A	D	C	F	E
		Rear	H	G	J	I	L	K
	17	Front	K	L	I	J	G	H
		Center	Q	R	Q	P	M	N
		Rear	E	F	C	D	A	B
	18	Front	L	K	J	I	H	G
		Center	R	Q	P	Q	N	M
		Rear	F	E	D	C	B	A

Note: The letters A through R represent the 18 tires included in the test.

FIG. 2—Buffing machine used to remove the tread of the tire. Separate adjustments are provided to control the tread radius, depth of tread removed, and the uniformity of tread on the two shoulders.

the tire. After buffing, the tire assembly is again weighed in the manner previously described and the weight of the tread is calculated from the initial and final weights and any corrections resulting from punctures.

If tires having the same tread design and carcass construction are tested, it is not necessary to buff the tread to determine the comparative treadwear. Since the volume of the tread is the same on such tires, relative treadwear can be determined from rate of wear and density measurements only.

Depth Method. In the tests reported in this paper, the depth of each tread groove was also measured each time that weight measurements were made. Depth measurements were made to the nearest thousandth of an inch at four locations in each groove, spaced approximately 90 degrees apart. Since the bottom of many tread grooves were not smooth, three or more readings were taken with a dial gage at each location. The minimum reading was taken to represent the depth at that point since exploratory tests showed this reading to be the most reproducible. The locations at which measurements were made were marked so that the depths could be measured at the same locations after each period. The values for the depths at the four locations in each groove were averaged. Considerable difficulty was encountered in measuring the depth of the grooves in certain tread designs, and the poorer reproducibility in making depth measurements in these tests than in tests previously reported *(3, 6)* may be partly attributed to this cause.

Calculation of Treadwear

The first step in the estimation of relative service life of tire treads from road test data is the calculation of the average rate of treadwear. For each tire there are as many measurements of rate of wear as there are periods in the test. However, each measurement is biased by the influence of the particular wheel on which the tire was run and by the particular conditions of test during the period. The bias is factorial rather than additive in nature, i.e., if the rate of wear of one tire on wheel 2 is twice that on wheel 1, then other tires wear twice as fast on wheel 2 as on wheel 1 under the same conditions of test *(3, 6)*. In order to eliminate these biases through the design of test, it is necessary that geometric instead of arithmetic averages be used. In practice, it is convenient to take the arithmetic mean of the logarithms of the wear values and then the antilog of this mean which is the same as the geometric mean.

The elimination of bias through the use of geometric averages can be seen from a consideration of the design of test in Table I. Let us assume that the respective rates of wear of tires A, B, C, and D are a, b, c, and d times the rate of wear of an arbitrary reference tire. Likewise, let us assume that the respective rates of wear on the right-front, left-front, right-rear, and left-rear wheels are k, l, m, and n times the rate of wear on an arbitrary reference wheel. Further, let us assume that the respective rates of wear during periods 1, 2, 3, and 4 are w, x, y, and z times the rate of wear during an arbitrary reference period. Then, if there is no random error of test, the rate of wear of each tire during each period is as shown in Table IV. This table also gives the geometric and arithmetic averages of the rates of wear for each tire.

It is apparent that the geometric averages for tires A, B, C, and D are always in the proportion a:b:c:d no matter what the values of k, l, m, n, w, x, y, and z may be. Thus, the relative rates of wear are not biased by the conditions of test when geometric averages are used. The absolute rates of wear are dependent on the conditions of test so that a tire can not be evaluated on an absolute basis. Even on a relative basis, however, the arithmetic averages do not generally give the correct ratio for the rates of wear of tires A, B, C, and D, but introduce a variable amount of bias in the results de-

TABLE IV—THEORETICAL RATES OF WEAR FOR TEST WITH ONE VEHICLE

Relative rates of wear: Tire A—a, Tire B—b, Tire C—c, Tire D—d
Right Front—k, Left Front—l, Right Rear—m, Left Rear—n
Period 1—w, Period 2—x, Period 3—y, Period 4—z

Period	Tire A	Tire B	Tire C	Tire D
1	akw	blw	cmw	dnw
2	alx	bkx	cnx	dmx
3	amy	bny	cky	dly
4	anz	bmz	clz	dkz
Arithmetic Average	$\frac{a(kw+lx+my+nz)}{4}$	$\frac{b(lw+kx+ny+mz)}{4}$	$\frac{c(mw+nx+ky+lz)}{4}$	$\frac{d(nw+mx+ly+kz)}{4}$
Geometric Average	$a\sqrt[4]{klmnwxyz}$	$b\sqrt[4]{klmnwxyz}$	$c\sqrt[4]{klmnwxyz}$	$d\sqrt[4]{klmnwxyz}$

pending on the relative magnitudes of the factors k, l, m, n, w, x, y, and z.

For example, the relative values for k, l, m, and n for one of the four-wheel drive vehicles during one of the tests reported in this paper are approximately 1.8, 1.3, 0.6 and 0.7 (see Table VI, vehicle 1). Similarly, the relative values of w, x, y, and z during one set of four periods in the same test are approximately 1.7, 1.8, 0.7 and 0.5 (see Table VIII, test Y, periods 9-12). If these values are substituted in Table IV, the arithmetic averages for the rates of wear of the four tires are in the proportion 1.51a:1.53b:1.03c:1.06d. Thus, if arithmetic averages are used, the conditions of test cause a bias which results in an overestimation in the rate of wear of tires A and B by about 50% with respect to tires C and D. This overestimation occurs even though each tire is run for the same number of miles in each wheel position. Although this example is the extreme condition in the tests reported here, it represents one that does occur in an actual road test.

The second and final step in the estimation of comparative tread life of each tire is to divide its total weight of tread by the geometric average of its rates of weight loss for all periods. In tests where depth measurements are made, the initial depth of the tread grooves is divided by the geometric average of the rates of decrease in the depth of the tread grooves.

Customarily, the difference between initial and final measurements or accumulated depth-loss is used for determining treadwear. This procedure is equivalent to multiplying each rate of wear in Table IV by the mileage during the period and adding the wear values for each tire. This sum is a multiple of the arithmetic average if the mileage is the same for each period. Therefore, any bias derived from the conditions of test that is present in the arithmetic average is also present in this sum. If the mileage per period varies, then the sum is affected by an additional source of bias, the magnitude of which depends on the relative mileages in the test periods.

Another common method for comparing the treadwear of tires is to run them until the treads are smooth, measuring the number of miles to reach this condition. This method includes two types of bias. In the first place, it has the bias inherent in taking arithmetic averages. Secondly, since two different tires can not be tested throughout their life under comparable conditions (because the mileages at which they become smooth are not the same), an additional bias is introduced whose magnitude depends on the relative rates of wear during the interval when the tires are tested together and when the one tire is tested alone.

Stechert and Bolt *(5)* determine tread life by plotting the logarithm of accumulated loss in depth of the tread grooves against the logarithm of accumulated mileage. They then fit a straight line to the transformed data by the formulas of least squares and find by extrapolation the mileage to "baldness" (loss in depth = initial depth of tread grooves). A serious shortcoming of this method is the use of accumulated loss in depth, which is equivalent to arithmetic averaging with all the associated biases. The logarithmic scale used by Stechert and Bolt does not remedy this situation since the logarithmic transformation is made on accumulative data. In order to eliminate bias, it is necessary to convert the *individual* and *independent* values of depth loss for each period into logarithms before any summation is made.

Results and Discussion

The two tests of 6.50-16 tires, designated tests X and Y, comprise a total of 32 tires, each made in a different plant. Similarly, the test of 8.25-20 tires, designated test Z, comprise a total of 18 tires each made in a different plant. All tires are first-line quality, taken at random from production. For each tire, an estimate of the tread life by each method of test can be determined by the procedures described under "Calculation of Treadwear." These estimates for the 50 tires included in the three tests are given in Table V.

In each test, the tires are arranged in decreasing order of tread life based on the average of the estimates by the three methods. Examination of the table shows

TABLE V—ESTIMATES OF TREAD LIFE

Test	Tire	Weight Method (miles)	Depth Method — Center Grooves (miles)	Depth Method — All Grooves (miles)
X	1	45900	35700	40700
	2	41900	39200	40300
	3	37500	31100	43300
	4	33400	28100	31000
	5	31000	24000	35000
	6	30500	28700	30500
	7	30900	25900	32200
	8	31900	23300	33100
	9	30400	23100	33100
	10	27300	23700	23400
	11	20400	20900	24900
	12	24500	16100	25400
	13	20900	19900	24100
	14	18900	15200	21700
	15	13700	11500	15600
	16	11400	11200	13400
	Average	28200	23600	29200
	Range	34500	28000	29900
Y	1	44100	32200	44100
	2	36800	31600	32000
	3	35700	27600	36400
	4	34900	28500	31400
	5	27300	23500	34700
	6	28900	25200	29600
	7	27000	27600	27900
	8	29000	24300	24900
	9	21800	18400	19900
	10	21500	18100	20500
	11	18900	16000	20600
	12	17100	14200	21600
	13	17100	17800	17200
	14	17300	15600	17400
	15	15600	16600	17200
	16	16900	14000	16300
	Average	25600	22000	25700
	Range	28500	18200	27800
Z	1	52600	33500	46300
	2	47100	33800	50300
	3	46100	34500	47200
	4	55800	31100	40400
	5	56600	30800	38100
	6	48300	33000	39100
	7	43800	28800	36100
	8	36200	30600	39700
	9	41200	26800	35200
	10	41200	27700	31800
	11	40100	27700	31300
	12	36300	26200	31300
	13	37000	25200	30400
	14	33900	24600	27300
	15	27300	26500	29200
	16	30900	23600	27100
	17	28300	20700	31700
	18	28000	22900	27600
	Average	40600	28200	35600
	Range	29300	13800	23200

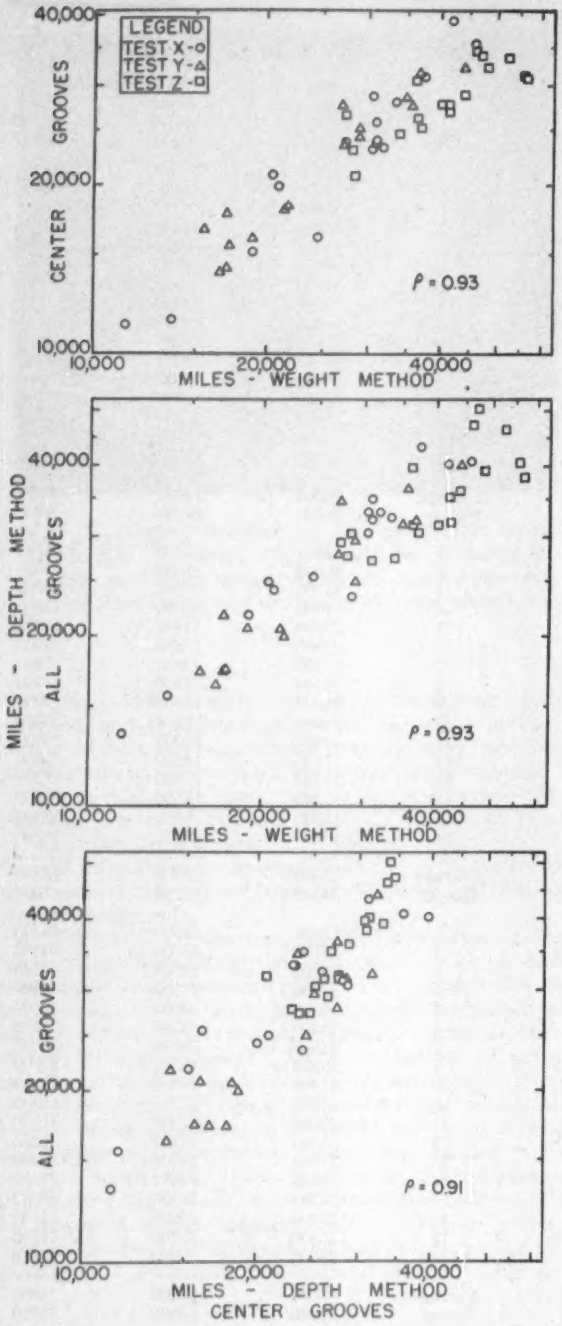

FIG. 3—Correlation of tread life estimates using the three methods of measurement. ρ is the correlation coefficient.

that the mean value and the range of values for the tires in each test are smallest when determined by the depth method using the center grooves. These results confirm those previously reported *(3, 6)* which showed the depth method using center grooves to be less sensitive than the weight method and to underestimate differences in rate of wear between tires.

The data of Table V are plotted on a logarithmic scale in Figure 3 to facilitate the study of correlation between the different methods of test. It is seen that the correlation between the weight method and either of the depth methods (correlation coefficient 0.93) is as good as the correlation between the two depth methods (correlation coefficient 0.91). Thus, the three methods are in general agreement in the relative evaluation of tread life.

Although the correlations in Figure 3 are above 0.9, there is considerable scatter or uncertainty in the points. In order to appraise the reliability of the estimates listed in Table V and plotted in Figure 3, it is necessary to determine the precision of each method. The subdivision of the designs in Tables II and III into sets facilitates these determinations. In tests X and Y, rates of wear or estimates of tread life can be evaluated using each of the four sets of four periods. Four independent estimates for each tire are thereby obtained. Similarly, three independent estimates can be obtained from the three sets of six periods in test Z. In order to make such estimates, however, it is necessary to apply a correction for the differences in rate of wear on different wheels since during a set a tire is tested on only four or six wheels. These corrections are determined from the data for the entire test.

The need for such corrections is seen in Table VI which lists the relative rates of wear on the individual wheels of the four-wheel and six-wheel drive vehicles used in these tests. It is seen that the rate of wear on different wheels of the same vehicle may differ by a factor of 3 or more even though care is taken to align the wheels. This variation in rate of wear on individual wheels is eliminated by dividing the wear of a tire on each wheel by the appropriate value in Table VI, or more conveniently by applying an additive correction to the logarithm of the rate of wear.

The application of these corrections eliminates systematic errors caused by wheel effects. A comparison of the corrected values gives a measure of purely random errors, i.e., of the precision of test. From the 3 or 4 estimates of tread life for each tire, coefficients of variation can be calculated for each tire by each method of test. The coefficients for tests X and Y were multiplied by the square root of 4 and those for test Z by the square root of 6 in order to convert them into coefficients of variation per test period.

TABLE VI—RELATIVE RATES OF WEAR ON INDIVIDUAL WHEELS

Four-Wheel Drive Vehicles

	Vehicle				Geometric
Position	1	2	3	4	mean
Left Front	157	120	92	127	122
Right Front	223	133	98	218	159
Left Rear	81	74	73	74	75
Right Rear	70	69	68	68	69
Geometric Mean	119	95	82	108	100

Six-Wheel Drive Vehicles

	Vehicle			Geometric
Position	1	2	3	mean
Left Front	118	101	150	122
Right Front	134	104	162	131
Left Center	92	68	101	85
Right Center	75	59	71	68
Left Rear	112	96	120	109
Right Rear	106	90	103	99
Geometric Mean	104	85	113	100

In Figure 4, such values for all 50 tires are plotted as a function of the estimated tread life for each method of test, the horizontal line indicating the average coefficient of variation for each test. It is to be noted that the points on these plots, particularly the one for the weight method, show no trend either upward or downward. Thus, the coefficient of variation (relative error of test) is practically the same for tires of high and low tread life. Consequently, the absolute error of test tends to be proportional to the magnitude of wear, an observation consistent with findings of previous treadwear studies *(3, 6)*. The horizontal line for the weight method is much lower than the line for either depth method, indicating that the weight method is much more precise. The calculated average coefficient of variation per test period is 18.2% for the weight method, 32.7% for depth-of-center grooves method, and 31.2% for depth-of-all grooves method,

In order to determine the significance of the values in Table V, the coefficients of variation per test period must be divided by the square root of the number of periods—16 for tests X and Y or 18 for test Z. Thus, the coefficient of variation of the values in Table V is about 4.5% for the weight method and about 8% for either one of the two depth methods. To reduce the 8% coefficient of variation for the depth methods to the 4.5% level of the weight method, it would be necessary to run approximately 50 periods, or approximately three times the mileage required by the weight method.

As mentioned under "Design of Test," the subdivision of the plan into sets permits reliable estimates to be made in less than 16 or 18 periods. Ordinarily, if there are fewer periods than there are tires in the test, there is a bias favoring the tires that are tested on wheels of slow rate of wear and penalizing those that are tested on wheels of fast rate of wear. However, if the test is properly designed, it is possible by statistical methods to eliminate any bias resulting from the failure to test each tire on each wheel.

For example, the design of test in Tables II and III is such that a Youden square *(1, 7)* can be formed with the data for all but the last set of periods. In this manner, unbiased estimates can be obtained in only 12 periods of test. The relative ratings in Table VII and Figure 5 illustrate the excellent agreement that is ob-

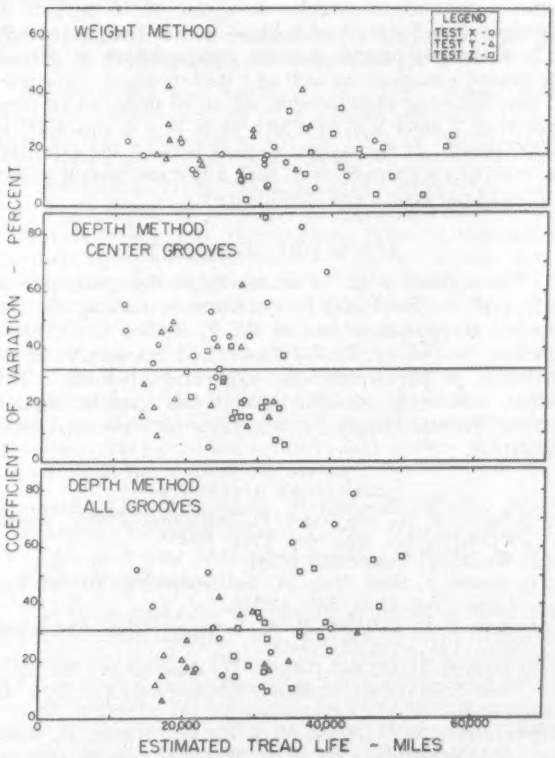

FIG. 4—Precision of the three methods of measurement. The solid line is the average coefficient of variation for all tires. The most precise method is the one having the smallest coefficient of variation.

TABLE VII—RELATIVE RATINGS OF TREAD LIFE

Test	Tire	Weight Method (Periods) 1-12	Weight Method (Periods) All	Depth Method—Center Grooves (Periods) 1-12	Depth Method—Center Grooves (Periods) All	Depth Method—All Grooves (Periods) 1-12	Depth Method—All Grooves (Periods) All
X	1	166	163	167	151	150	139
	2	151	149	177	166	141	138
	3	134	133	135	132	159	129
	4	116	118	116	119	102	114
	5	111	110	98	102	127	103
	6	110	108	126	122	105	96
	7	115	110	116	110	115	111
	8	110	113	88	99	104	115
	9	110	108	96	98	112	110
	10	94	97	102	100	76	88
	11	69	72	88	89	82	86
	12	88	87	62	68	84	95
	13	74	74	80	84	80	80
	14	63	67	58	64	70	82
	15	48	49	45	49	51	61
	16	40	41	44	48	42	54
	Mean	100	100	100	100	100	100
Y	1	175	176	151	147	180	172
	2	145	147	149	144	121	124
	3	132	143	126	126	159	141
	4	133	140	132	130	118	122
	5	106	109	109	107	130	135
	6	112	115	115	115	114	115
	7	108	108	132	126	108	109
	8	108	116	103	111	86	97
	9	85	87	83	84	76	77
	10	85	86	87	82	82	79
	11	75	75	70	73	78	80
	12	73	68	61	65	86	84
	13	66	68	70	81	67	66
	14	67	69	72	71	67	68
	15	60	62	74	76	64	67
	16	68	68	64	64	64	63
	Mean	100	100	100	100	100	100
Z	1	127	130	126	119	144	130
	2	122	116	117	120	156	141
	3	112	114	127	122	131	133
	4	135	137	104	110	110	114
	5	131	139	106	109	118	107
	6	122	119	111	117	104	110
	7	105	108	98	102	91	101
	8	88	89	107	108	105	112
	9	106	102	96	95	98	99
	10	106	102	105	98	90	89
	11	105	99	95	98	87	88
	12	93	89	98	93	94	88
	13	87	91	83	89	79	85
	14	81	84	91	87	75	77
	15	65	67	94	94	78	82
	16	74	76	85	84	76	76
	17	70	70	77	73	93	89
	18	68	69	77	81	74	78
	Mean	100	100	100	100	100	100

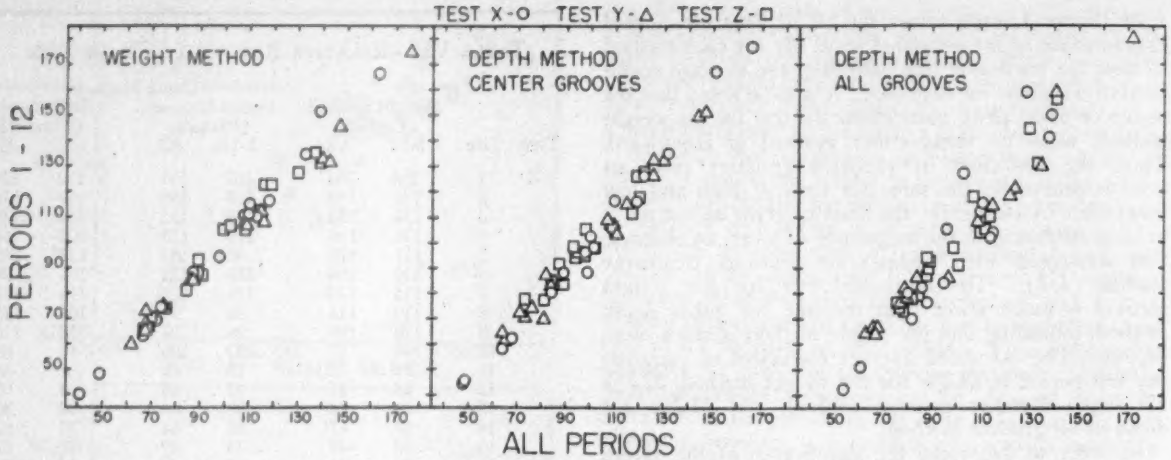

FIG. 5—A comparison of the relative ratings obtained from a shortened test of the first 12 periods with those obtained from the complete test of 16 or 18 periods.

tained between results based on the first 12 periods and on all 16 or 18 periods, particularly for those obtained by the weight method. The only disadvantage of the shorter test is a sacrifice in precision, e.g., the coefficient of variation using the weight method is 5.3% for a test of 12 periods as against 4.6% for a test of 16 periods.

The designs in Tables II and III are based on the assumption that all tires are tested simultaneously in a convoy type of road test. If this condition is not fulfilled (i.e., if the number of tires in a test is larger than the number of wheels so that some tires are in storage while others are being tested), then it becomes necessary to compensate for period-to-period variability in a manner similar to the compensation for wheel to wheel variability when each tire is not tested on each wheel. The need for such compensation is manifest on examination of Table VIII which gives the average weight loss of all tires in each period for all 3 tests. The values in this table are geometric averages derived from weight measurements. It is seen that the average rate of wear of the same set of tires varies greatly from period to period even though the same vehicles are run over the same route under essentially the same conditions. The corresponding depth losses show similar variation and in addition are abnormally large for the first period in each test. These observations confirm those previously reported *(3, 6)*.

Recently, Youden and Connor *(8)* introduced a new type of statistical design known as chain-blocks. The use of such a design makes it possible to test 16 tires on 4 four-wheel vehicles in 8 periods. Through a generalization of the chain-block design which will be discussed in a future paper *(2)*, it is possible to compare 32 tires with 4 four-wheel vehicles in a test of 16 periods or 36 tires with 3 six-wheel vehicles in a test of 24 periods. These designs provide for the compensation of period-to-period variations as well as wheel-to-wheel variations. Thus, by using such designs, 32 or 36 tires can be compared in a road test in which each tire is run 4000 to 6000 miles. If the weight method is used, the estimates of comparative tread life in such a test are certain within 10 to 13 per cent (95% confidence).

TABLE VIII—AVERAGE RATES OF WEAR IN INDIVIDUAL PERIODS

(Grams per Thousand Miles)

Period	Test X	Test Y	Test Z
1	98	101	144
2	84	88	60
3	98	110	154
5	74	112	126
5	90	135	119
6	71	100	125
7	84	86	87
8	59	102	119
9	81	108	114
10	77	115	80
11	67	48	118
12	69	31	98
13	51	110	101
14	71	100	101
15	93	113	95
16	74	82	82
17	—	—	57
18	—	—	74

ACKNOWLEDGMENT

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Automotive Adhesives

A Panel Discussion Held at the February 13, 1953 Meeting of the Detroit Rubber and Plastics Group

THE Detroit Rubber and Plastics Group held an interesting panel discussion on "Automotive Adhesives" on February 13th at the Detroit-Leland Hotel in Detroit, Mich. J. T. O'Reilly (Ford) acted as moderator for the discussion. Panel members included Charles L. Stachel (U. S. Rubber), Samuel Adinoff (St. Clair Rubber), Gordon Lindner (Minnesota Mining), John Clark (Packard), and Dr. A. Carter (Chrysler). J. Forcyth (Fisher Body) was also scheduled to be present, but was unable to attend because of illness.

The meeting opened with the presentation of short talks by the panel members on the different types of adhesives used in automotive manufacture. In an opening statement, Mr. O'Reilly pointed out that the first automotive adhesive was probably a water-soluble glue for trim, etc. As the volume and variety of applications developed, so did demands on the adhesive. He pointed out that the "magnetic" weatherstrip cement called for by J. L. McCloud at a similar meeting some time ago was still being sought.

Talks presented by the panel members appear below, followed by the questions asked of the panel and the answers given:

Sub-Assembly Trim Adhesives. ***Charles L. Stachel (U. S. Rubber Co., Detroit, Mich.).***

Sub-assembly trim includes side panels, visors, dash insulators, etc., made up in a separate assembly operation and later installed in the car body in the assembly plant trim line. Types depend upon the fabricator's set-up and include latex emulsion, water dispersions, solvent types based on natural and synthetic rubber modified with resins, and thermosetting types. Application methods are as varied as the adhesives and include manual spray, automatic spray, brush, dip, and roll coat. Almost completely automatic assembly line methods are finding increasing application. On one of the newer lines, panels are laid up with bands of thermosetting adhesive on the base board, separated by cotton wadding and covered by vinyl trim. Chrome is adhered to the face with the same adhesive. Heat and pressure in a hydraulic press cure the adhesive and emboss the vinyl trim without the need of any sewing.

Assembly Line Adhesives. ***J. Forcyth (Fisher Body Division, General Motors Corp., Detroit, Mich.). (This talk was presented by Mr. O'Reilly in Mr. Forcyth's absence).***

The main application is as an adhesive to hold the headliner cloth around the windshield and backlight openings until metal trim strips around these openings can be installed. The clamping action of the trim strips and the adhesive hold this trim in place during service. Since the open time varies according to assembly plant practice from a few seconds to several minutes, a long tack range is generally necessary. It should be sprayable or brushable, and not bleed through either acetate or napped cotton headliners. Since area of glass in modern cars has increased and caused a corresponding increase of inside summer temperatures, a 200°F. softening point is desirable. Adhesives are also used to fasten miscellaneous anti-rattler jut pads, floor mats, etc.

Weatherstrip Adhesives. ***Samuel Adinoff (St. Clair Rubber Co., Marysville, Mich.).***

Weatherstrip cements are exactingly made for an exacting situation. Application is by brush, spray, or roller coating, each method requiring different properties. Important properties are viscosity, speed of drying and setting, final adhesive strength, flexibility, and resistance to heat, cold, water and aging. Such adhesives must bond well to both painted metal and sponge rubber and in the presence of residual mold lubricant and without pressure. The current type weatherstrip of the so-called cantilever type puts an additional cold flow type of strain on the cement. The importance of having the rubber surface free of mold lubricant, talc, etc., which interfere with adhesion, cannot be over-emphasized.

Silencer Pad Adhesives. ***Gordon Lindner (Minnesota Mining and Manufacturing Co., Detroit, Mich.).***

There are two functions for silencer pads: (1) vibration dampener on all automotive panels, (2) sound deadener. Such pads are applied at two points in production lines: (1) in metal stamping shop, (2) on assembly or trim lines. In the first instance metal is greasy and adhesive must penetrate such films and adhere. Water-base emulsions seem best suited. Subsequent conditions due to either handling, shipping, or other assembly operations put this adhesive to severe tests. It must withstand nearby welding, repositioning of part, freezing, rustproofing baths, and paint ovens. In the second instance, metal is usually clean and either water- or solvent-base adhesives may be used. The adhesive must still be of a quality to withstand both high and low temperatures and mechanical shock and must be age resistant.

Miscellaneous Automotive Adhesives. ***John Clark (Packard Motor Car Co., Detroit, Mich.).***

This group of adhesives was divided as follows: (1) Functional, (2) Assembly, and (3) Miscellaneous. The first type relates to those used as bonding agents for flocs and mold cores. Assembled flocs act as panel and spring deadeners and as anti-abraiding pads. The second type relates to those used to temporarily hold parts in place during assembly. Such parts might be gaskets, body shims, body mounts, mold cores and the like. The third type relates to container sealing, labeling and applying grit to snagging wheels.

Brakes and Automatic Transmission Band Adhesives. ***Dr. A. Carter (Chrysler Corp., Detroit, Mich.).***

Brass plating to secure natural rubber was later supplemented by chlorinated type adhesives. With synthetic

rubber, particularly, best results were obtained with cyclicized rubber.

First successful use of adhesives for such friction materials as brake lining, which started in 1945, has expanded in production and for dealer replacement. Fairly high shear strength is required. The adhesive must tolerate high temperatures and be resistant to water, brake fluids, etc. Thickness of adhesive varies from 8/1000 to 16/1000 inches.

The metal surface can be cleaned mechanically or by phosphate coating. A successful bond is also dependent upon the type of friction material used. Pressure should range from 100 to 200 psi and temperature from 325°F. for 20 minutes to 425°F. for about 8 minutes.

Automatic transmission bonds are a newer application where both heat and oil resistance are required. One type of adhesive is based on a phenolic type resin and Buna N rubber and a second type is merely a phenolic resin cement. Adhesives are offered as a liquid which can be either sprayed or roll coated and as tapes.

We believe that ultimately adhesives will find a place in body work, such as doors where two pieces of metal are clamped by a lap-over joint. Welding and subsequent nicks which have to be taken out prior to painting would be eliminated. A new "epoxy" resin is a part of the future when we will use adhesives that cure at room temperature, without pressure and with no shrinkage.

Questions and Answers

Question—In adhering 50 durometer cured rubber to a clean metal surface, what is the maximum bond strength obtainable with air dry adhesives?

Answered by Mr. Adinoff: There are so many variables it is almost impossible to give an exact answer.

Answered by Dr. Carter: About 100 to 200 pounds per square inch in tension on dry air adhesives, and as high as 1000 psi with catalyst types such as resorcinol.

Question—How is it possible to adhere silencer pads to oil metal using a water-base adhesive?

Answered by Mr. Lindner: The soap emulsifier in the adhesive tends to emulsify the oils and drawing compounds on the metal so as to permit adhesion.

Question—Please comment on the types of materials which will tend to make adhesives stick firmly to metal, but will not retard subsequent vulcanization (no bond to metal after vulcanization is required).

Answered by Mr. Stachel: Silicones can be used to stop off an area on a very sharp line, for example, on brass plate areas where adhesion is not desired.

Question—What development is being carried out to extend such aircraft applications as metal to metal adhesives and sandwich construction in the automotive industry?

Answered by Mr. Lindner: Buna N and phenolic types as well as epoxys and polyesters are being considered.

Answered by Dr. Carter: The aircraft industry wants cements to be resistant to 250°C. and have a 2000 psi shear strength.

Question—What progress is being made with dry-back cements?

Answered by Mr. Lindner: One difficulty is the problem of blocking during shipment. Its economy is doubtful. A more fool-proof method of applying the weatherstrip is needed.

Question—Discuss the automotive attitude toward wet-back pressure sensitive vs. dry-back adhesives.

Answered by Mr. Clark: The preferred method depends upon the particular sequence of operations used. Each has its own advantages and limitations.

Question—It was mentioned that a good heat-resistant adhesive also is weather resistant. Could you say what type of adhesive binder is used in such an adhesive?

Answered by Mr. Adinoff: The best heat-resistant adhesives, to my knowledge, employ reclaimed rubber.

Question—Has any information been published relative to "open" or "tack time" vs. humidity and temperature?

Answered by Mr. Clark: The "open time" of an adhesive depends on more variables than can be conveniently correlated. "Open time" cannot be defined very accurately except on some specific job using some specific formulation.

Answered by Mr. Lindner: There are a number of tests of the empirical type available. It is possible to measure tensile and shear at various "open times" under controlled conditions of temperature and humidity. In order to get reproducible results other factors must be controlled also, such as coat thickness, pressure applied to the bond, and time of pulling after bond is made. One standard test is the Fisher test for trim cements. The "open time" decreases with increasing temperature and increases with increasing humidity.

Question—Have adhesive manufacturers made weatherstripping adhesives that will satisfactorily penetrate residual parting agents on the bonding surfaces of automotive weatherstripping?

Answered by Mr. Lindner: We have evaluated a large number of compositions with respect to this question and have never obtained satisfactory results with weatherstripping that was appreciably contaminated in this way. Parting agents must be removed before good bonding is obtained.

Question—Does the solvent used in making an adhesive affect the bond after it is evaporated?

Answered by Mr. Adinoff: Generally speaking, the answer is no—if single solvents are used. If mixed solvents are used, i.e., where the solvent components have widely different solvencies for the binder, this generally is not true. The volatilities of the components of this solvent mixture are chosen so that the best solvent evaporates last in order to obtain the best bond.

Question—A few listeners would appreciate a general statement as to what goes into a rubber type adhesive compound.

Answered by Mr. Adinoff: Generally, they are composed of a rubber, a resin, and a solvent. Other items such as fillers and surface active agents may be included.

Production of Cast Aluminum Molds for Forming Foam Rubber Products

By ROBERT F. DALTON

Development Engineer, United States Gypsum Co., 300 West Adams St., Chicago 6, Ill.

FOAM rubber molds are being cast to close to tolerance using a new type of permeable metal casting plaster. During the mixing operation a considerable quantity of air is added to produce a rigid sponge-like mass of cellular plaster which when properly dried produces a mold with many times the permeability of conventional metal casting plasters. This results in a mold that is much easier to dry and is more dimensionally stable, enabling the production of castings that are more accurate. Although the process varies slightly from foundry to foundry, the following description is typical.

After the foundry receives blueprints of the castings to be made, the patterns are constructed by a plaster process. A metal template of the inside contour (the critical side of the casting) is made with ⅛-inch shrinkage allowance. A plaster male is made on a marble slab using the templates to form the pattern as the plaster is going through its period of plasticity. Contrary to popular notion formulated plasters are being produced with a relatively long period of plasticity so that they may be shaped or "screeded" under a template for relatively long periods of time, as the plaster continues to set. More than one plaster mix may be used to complete the pattern.

The plaster male is soap shined or lacquered, a coat of separator is applied, and a splash cast opposite is made using a low expansion gypsum cement (such as Hydrocal, a product of the United States Gypsum Co.). Sisal fiber is used to reinforce the relatively thin (1 to 2 inches) splash cast and to "tie in" a metal or wood frame which promotes rigidity, ease of handling and a flatback surface. This is the production pattern, made in a space of a few hours at a very economical cost.

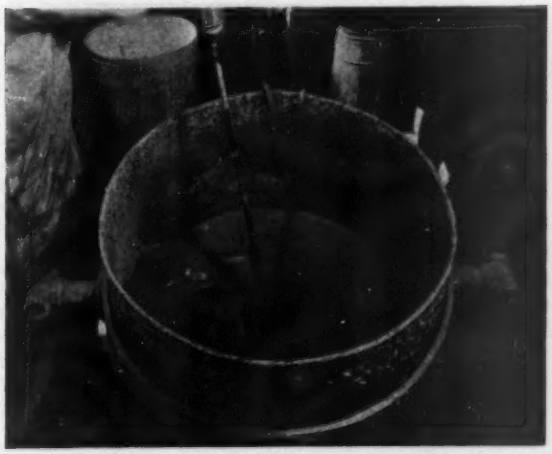


FIG. 1—View of the foamed mix, which contains definite amounts of plaster, water and air, ready to be poured over the pattern.

FIG. 2—The foamed plaster mix is poured into the flask with as little disturbance as possible. Splashing should be avoided.

Once the patterns have been through the foundry they may be stored for an indefinite time for future orders. The pattern is lacquered or soap shined and a coat of separator applied and is ready for foundry use.

In preparing the foamed plaster mix, 200 pounds of Hydroperm, a specially-formulated plaster developed by the United States Gypsum Co., is added to 200 pounds of warm (100° F.) water, allowed to soak for a few minutes, and then mixed vigorously for 3 to 4 minutes with a high speed wire whip. This action entrains air into the formulated plaster and the volume of the mix is increased some twenty-five per cent. This may be checked by using a measuring stick before and after mixing. The plaster slurry should be mixed until it starts to "cream." This action may be noted by watching the mix at the side walls of the mixing vessel and when "creaming" starts the plaster will slow down in speed as it travels in the direction of the mixer shaft. The foamed mix containing definite amounts of plaster, water and air is then ready to pour over the pattern (see Figure 1).

Making the Mold

In the production of the actual mold, the pattern is suitably enclosed in a metal flask, making certain that all of the joints are tight. The foamed plaster mix is then poured into the flask with as little disturbance as possible (see Figure 2). Note the use of the rubber bowl beneath the pouring spigot to reduce splashing. The plaster is allowed to set for a few minutes and the back of the mold is "struck off" to make a flat level surface. After

FIG. 3—The molds must be dried to remove all excess water. These particular molds were dried for 10 hours at 400° F.

FIG. 4—The aluminum alloy used for the molds is melted in conventional foundry furnaces, dipped out, skimmed carefully and cast at 1250° F.

15 to 20 minutes the assembly is rolled over and the pattern removed with an overhead crane.

Since the pattern makes only the drag half of the mold, the cope is formed over the foamed drag half. This is done by "claying up" vertical and slanting walls, applying a soap size and a separator to the drag half and pouring another foamed plaster mix directly over the drag half enclosed in a suitable flask with a pin aligning arrangement. The cope half is "struck off" flat as was done with the drag half. After 15 to 20 minutes the mold is separated.

The metal thickness is obtained with spacer bars of the proper thickness between the cope and diagonal halves and the use of clay side walls permits the formation of a uniform thickness mold cavity in the horizontal plane. The metal thickness may also be obtained by laying sheets of water clay or uncured rubber of the proper thickness over the drag half. Thus, relatively inexpensive pattern equipment is required and the time from "print to casting" is reduced, expediting delivery dates. Wedge gates are provided through the top of the cope.

Before casting the metal, the molds must be dried to remove the excess water provided during the mixing operation. This may be done in conventional foundry core ovens at normal core oven temperatures. The particular molds shown in Figure 3 were dried for 10 hours at 400° F. The presence of "free" water may be detected with moisture meters with the precaution of having the prods in the center of the thickest part of the mold.

Pouring the Metal

The mold is cleaned, assembled with the proper thickness spacer bars between the cope and drag, and clamped down on a vacuum table. The use of spacer bars is similar to the production of integral pressure cost match plates. Mold joints are sealed with a plaster mix. Number 43 aluminum alloy is melted in conventional foundry furnaces, dipped out, skimmed carefully and cast at 1250° F. (see Figure 4). The relatively high plaster pouring cups allow additional pressure on the metal while filling the mold and are held in place with circular cast iron weights.

In the background of Figure 4 may be noted crates of cylindrical insulating riser sleeves. These are formed in core boxes from excess material in mold making, dried and shipped to a local sand foundry for use. Insulating riser sleeves made of foamed metal casting plaster are used very effectively in sand foundries, increasing the yield and aiding in the production of much sounder castings than were possible previous to their use.

The castings are shaken out, gates removed and a minimum of work is done before being ready for use. How close can this work be held on dimensional tolerance? A thirty-inch cavity length is being cast consistently to 1/64ths of an inch (see Figure 5). Wall thicknesses are being held to a minimum for faster curing of the foam rubber. Thin wall sections over large areas are easier to form in foamed metal casting plaster because of the slow chilling effect of the plaster mold as compared to sand molds. The opportunity for misruns and defective castings is minimized because of the high permeability of the foamed plaster.

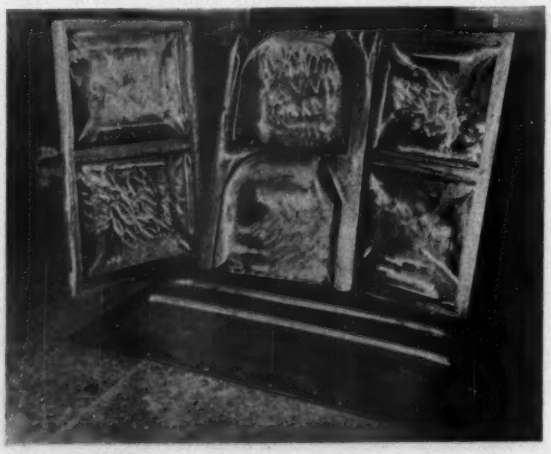


FIG. 5—Wall thicknesses of finished molds, such as these, are being held to a minimum to provide faster curing of foam rubber products.

Division of Rubber Chemistry, A. C. S., Meets in Boston on May 27-29, 1953

AS previously announced, the 63rd Meeting of the Division of Rubber Chemistry of the American Chemical Society will be held at the Hotel Statler, in Boston, Mass., on Wednesday, Thursday and Friday, May 27, 28 and 29. Harry W. Sutton, of the Boston Woven Hose & Rubber Co., is chairman of the Local Arrangements Committee.

The meeting will feature the presentation of 22 technical papers at three separate sessions. The first session will be held on Wednesday afternoon, May 27, with Seward G. Byam (DuPont), Divisional Chairman, presiding; the second on Thursday morning, May 28, with Joseph L. Haas (Hodgman Rubber) presiding, and the third on Friday morning, May 29, with Alan W. Bryant (Binney & Smith) presiding. The afternoon of Thursday, May 28, has been left open for plant visits. These will include the plants of the Hood Rubber Co., Boston Woven Hose & Rubber Co., Dewey and Almy Chemical Co., Simplex Wire & Cable Co., the Ford Motor Co. and the new Cabot Laboratories on "Research Row."

Social activities at the meeting will include a luncheon of the 25-Year Club on Wednesday noon, a concert by the famous Boston Pops Orchestra on Wednesday evening, and the divisional banquet on Thursday evening. An exceptionally interesting program for the ladies has also been arranged, as outlined in our previous issue.

Abstracts of the 22 papers scheduled for presentation, together with their authors and their company connections, follow:

Program of the
DIVISION OF RUBBER CHEMISTRY
AMERICAN CHEMICAL SOCIETY
Hotel Statler, Boston, Mass.
May 27-29, 1953

Wednesday Morning—May 27

9:00 A.M.—Registration.
11:00 A.M.—25-Year Club Luncheon, Hotel Statler.

Wednesday Afternoon—May 27

2:00 P.M.—Introductory Remarks by Seward G. Byam (DuPont), Division Chairman.
2:10 P.M.—Technical Papers.

Wednesday Evening—May 27

8:00 P.M.—Boston Pops Concert, Symphony Hall.

Thursday Morning—May 28

9:00 A.M.—Technical Papers.
10:50 A.M.—Business Meeting.
11:15 A.M.—Technical Papers.

Thursday Afternoon—May 28

2:00 P.M.—Plant Visitations.

Thursday Evening—May 28

7:00 P.M.—Divisional Banquet, Hotel Statler.

Friday Morning—May 29

9:00 A.M.—Technical Papers.

ABSTRACTS OF PAPERS

Wednesday Afternoon—May 27

Seward G. Byam, Presiding

2:00 P.M.—1—Introductory Remarks, *Seward G. Byam.*

2:10 P.M.—2—Effect of Variations of Oil Composition on Physical Properties of Cured Masterbatched Polymer Compounds. *W. K. Taft, R. W. Laundrie, J. Duke, and A. D. Snyder (Government Laboratories, University of Akron, Akron, Ohio). (Paper will be presented by Mr. Laundrie).*

A series of oils, submitted by the Esso Standard Oil Co., varying in so-called "aromaticity," which is defined as the acid reactive hydrocarbons as determined by the Rostler method, were masterbatched with high Mooney viscosity GR-S-1500 type latex in order to determine possible correlations between the "aromaticity" of the oils and the physical properties of the vulcanizates of the masterbatched polymers. In addition to this series of oils, Circosol-2XH, Sundex-53, Califlux GP, and Dutrex 20, Resin 731 and 1/2 Resin 731/Circosol-2XH were also included. The GR-S-1500 latex, with a contained polymer of about 160 ML-4 viscosity, was masterbatched with 45 parts of oil.

It was found that many properties of the masterbatches generally can be correlated with the difference in "aromaticity" of the oils. Tensile strength, modulus, optimum cure, hysteresis, freeze point, hardness, and possibly hot rebound increased with an increase in the "aromatic" content of the oil used in the masterbatch. Flex life of the vulcanizates became poorer with increased "aromaticity" of the oils in the stocks. The mill processing or Garvey die extrusion characteristics of the masterbatches were all good and no correlation was found with the type of oil. Power consumption data for a 1500 gram loading of a laboratory Banbury indicated decreasing power consumption with an increase in the "aromaticity" of the oil in the masterbatch.

(NOTE: This work was carried out under the sponsorship of the Office of Synthetic Rubber, Reconstruction Finance Corporation, in connection with the government synthetic rubber program.)

2:25 P.M.—3—Effect of Type of Oil Used in Masterbatching on Molecular Structure of Polymer. *W. K. Taft, J. Duke, R. W. Laundrie, A. D. Snyder, and D. C. Prem (Government Laboratories, University of Akron, Akron, Ohio). (Paper will be presented by Miss Duke).*

The storage stability of masterbatches made with different oils has been shown to vary, and can be a serious problem in the case of highly "aromatic" oils. The change in the ratio of Mooney viscosity decrease to dilute solution viscosity decrease has been correlated with the change in the molecular weight distribution of the polymer. In the presence of oils with a higher "aromatic" content, the polymer chain tends to break near the middle of the molecule under certain conditions of treatment, whereas, under the same conditions in the presence of the less "aromatic" oils, the chain breaks near the end of the molecule yielding a relatively large amount of short chains or low molecular weight material.

The tensile strength of the vulcanizates has been shown to correlate with the point of scission, which supports the theory

that the short fragments cause low tensile values. The effects of heating in air and of Banbury treatment of the masterbatches made with various types of oils have been shown. Differences in the rate of chain scission and condensation caused by the character of the oils have been noted, and data are presented which can be used as a guide to what may be expected from the effect of various processing conditions on the properties of the finished compounds, such as tensile strength.

(NOTE: This work was carried out under the sponsorship of the Office of Synthetic Rubber, Reconstruction Finance Corporation, in connection with the government synthetic rubber program.)

2:35 P.M.—4—Factors Influencing Polymer Breakdown. ***W. K. Taft, J. Duke, A. D. Snyder, D. C. Prem, and H. Mooney (Government Laboratories, University of Akron, Akron, Ohio). (Paper will be presented by Mr. Taft).***

Heat aging of masterbatches containing a mixture of a processing oil and varied proportions of nitrogen bases, defined by Rostler's method of analysis, results in degradation that becomes more rapid with the addition of greater than about 15% nitrogen bases. These results confirm previous work.

Antioxidants phenyl beta naphthylamine and an alkyl aryl phosphite at 1.25 percent level protected synthetic rubber differently with respect to stability towards heat. Twice this amount of the antioxidants caused the rates of chain scission and condensation of the cold rubber to be increased. Addition of Circosol-2XH and Dutrex 20 to the latex containing 1.25 percent of the antioxidants caused generally the same chain scission and condensation effects as occurred when the antioxidant levels were increased, but the effects with the two oils were not quantitatively the same, the Dutrex being the more reactive. Data show that there are optimum processing conditions, which probably vary with the combination of polymer, oil and antioxidant, as well as with the level of each, for producing the minimum amount of short chains in the processed polymer.

Oil-free polymers of different viscosity levels have been shown to differ in their relative heat stability. Agitation of the latex in the presence of air prior to the addition of oil has been postulated as a means of improving the heat and storage stability of the coagulated oil-polymer masterbatches. This postulation has been confirmed by results of heat aging in air and nitrogen.

The presence of hydroperoxides has been shown both to accelerate and to inhibit the breakdown of polymer in masterbatches, depending on the type of oil present, the conditions of heating or drying, and possibly the previous history of the latex. Naphthenic acids added to a paraffinic oil caused little change in the heat stability of the masterbatch.

(NOTE: This work was carried out under the sponsorship of the Office of Synthetic Rubber, Reconstruction Finance Corporation, in connection with the government synthetic rubber program.)

2:55 P.M.—5—Chromatographic Separation of Rubber-Processing Oils from Petroleum Sources. ***T. F. Mika, F. M. McMillan, and S. H. Page (Shell Development Co., Emeryville, Calif.). (Paper will be presented by Mr. McMillan).***

The increasing acceptance of petroleum source rubber-processing oils in oil-extended rubber has created a need for more detailed characterization of these products including the development of an analytical scheme which would permit rapid determination of composition.

Others have approached the characterization by determination of physical properties on fractions from either chemical treatment or from partial chromatography. In view of the simplicity of chromatography this method was examined in detail as a means of further characterization of the petroleum source oils. Following the chromatographic examination of several of the most commercially accepted oils a simple method adaptable to routine testing has been devised which permits the complete separation of an oil into several fractions. This separation coupled with the determinations of wax and nitrogen base contents permits a reproducible characterization.

A solvent solution of the rubber-processing oil adsorbed on a medium of Attapulgus clay over silica gel followed by irrigation of the sorbed solutes by successive portions of isopentane, benzene, acetone-isopropanol and acetone-acetic acid as elutriants gives good separation into saturates, aromatics, heterocyclics and resin fractions. An accurate method for following the course of elutriation with any one solvent is the ultraviolet spectrophotometric examination of the eluate since the appearance of peaks corresponding to the next type of structure gives well defined end points for the elutriation. Alternatively, the end points can be arrived at more simply and with sufficient accuracy and reproducibility by changing the elutriant as soon as the fraction extracted by any one solvent approaches a minimum (from a determination of solids content).

The proposed chromatographic technique has also been applied in a large enough scale to permit the separation of several pounds of processing oil and a determination of the effects of the separate fractions on a cold rubber tread stock.

3:15 P.M.—6—Petroleum Oil Extenders—Correlation of Properties in GR-S with Chromatographic Analysis. ***W. L. Dunkel, F. P. Ford, and J. H. McAteer (Chemical Division, Esso Laboratories, Standard Oil Development Co., Elizabeth, N. J.). (Paper will be presented by Mr. Dunkel).***

The expanding use of oil-extended GR-S emphasizes the need for improved characterization of petroleum oils and correlation of such data with properties of oil-polymer blends. Laboratory work carried out along such lines is summarized and preliminary conclusions are presented.

Laboratory studies were made to determine the chemical nature of extender oils representing a wide range of crude source and refinery history. This led to the use of a chromatographic method of analysis which is discussed in some detail. Another aspect was the evaluation of the oils, so examined, in actual GR-S compositions. Processability and hysteresis properties of these compounds were measured and analyzed with respect to the oil composition and typical oil properties. Visual examination of pigment dispersion, extrusion behavior and tensile strength were employed as criteria of processability. Hysteresis properties were determined on a forced vibration type instrument.

The following conclusions regarding the composition of oil extenders and the effect of these oils on GR-S may be drawn: (1) Chromatographic methods of analysis afford a rapid and reproducible means of characterizing extender oils. Such analyses provide quantitative estimates of the asphaltene, non-aromatic, aromatic and polar components; (2) The data obtained by this procedure may be correlated with properties of oil-extended GR-S compositions; (3) An oil having a high aromatic content favors good processability and high tensile values; (4) Oils of low aromaticity impart the best hysteresis.

3:40 P.M.—7—Superfast 41° F. GR-S Polymerization Recipes. ***J. R Miller (B. F. Goodrich Chemical Co., Cleveland, Ohio).***

Very rapid emulsion polymerization recipes have been developed on a quart bottle scale for the preparation of cold GR-S in less than 20 minutes at 41° F. These superfast recipes, which react 50 times as rapidly as conventional commercial cold rubber recipes, were necessary prerequisites for studying the economic feasibility of producing cold GR-S in simple, inexpensive pipeline reactors rather than in the large reaction kettles presently used in synthetic rubber plants. The superfast recipes were made possible by the availability of very active organic hydroperoxides, increased activator, initiator and soap concentrations in the interest of reaction speed, and further refinements of the "redox" polymerization principles which date back to 1940.

Initiator and activator levels employed were five times those normally used in regular cold rubber production, although a level of three times as much was sufficient to yield equally rapid rates. Phenylcyclohexane hydroperoxide at the 3.0 millimole level (per hundred grams of monomers) was the most effective initiator tested. Ferrous pyrophosphate and ferrous silicate at a level of 4.0 millimoles of iron were the most promising activators, with ferrous silicate activator giving 11 minutes to 60 percent conversion compared to 16 minutes for the pyrophosphate.

One all-fatty acid soap (potassium laurate) emulsified recipe and two mixed soap recipes (potassium laurate plus rosin soap) were used as the basis for this study.

4:00 P.M.—8—Gelation of 41° F. GR-S and Nitrazole CF Initiated (122° F.) Polymer as a Result of High Temperature Mastication. *Glen Alliger, W. S. Cook, and R. D. Wolfangel (Chemical and Physical Research Laboratories, Firestone Tire & Rubber Co., Akron, Ohio). (Paper will be presented by Mr. Alliger).*

It was found that 41° F. GR-S gels less readily than Nitrazole CF polymer as a result of high temperature mastication in a size B Banbury mixer. However, the Mooney plasticity which rises sharply with the formation of large amounts of gel in 41° F. GR-S remained constant or decreased as gelation occurred in Nitrazole CF polymers. These basic differences in the two polymers result in different processing characteristics. But of greater importance is the fact that the formation of polymer gel (in contrast to carbon gel), if it occurs at all readily, will be affected by slight differences in processing conditions and this will lead to variability in tread tubing properties.

In general, materials which were found to inhibit gel formation in 41° F. GR-S (hydroquinone, alkyl hydroquinones, certain alkylated phenols, etc.) were also effective in Nitrazole CF polymers and their use in improving the factory processability of compounds of the latter polymer is discussed in detail.

Oil-extended, high Mooney 41° F. GR-S like normal Mooney Nitrazole CF polymers did not undergo an increase in Mooney plasticity corresponding to the formation of gel at 350° F. The rate at which polymer gel was formed depended upon the type of oil. Polymers extended with the more aromatic type high in "nitrogen bases" were more resistant to high temperature gelation than those extended with "paraffinic" oils.

4:20 P.M.—9—Physico-Chemical and Rubber Reinforcing Properties of Super Abrasion Furnace Black. *J. F. Svetlik, H. E. Railsback, and C. C. Biard (Phillips Petroleum Co., Bartlesville, Okla.). (Paper will be presented by Mr. Svetlik).*

Super Abrasion Furnace (SAF) black, which became commercially available in 1952, is compared for rubber reinforcing properties in GR-S-1500 and natural rubber with HAF, MAF and EPC type blacks at variable black levels. The effects of the blacks on stress-strain, hysteresis, crack growth, hardness and abrasion properties are discussed. SAF black, because of its high reinforcement potential, gives a greater amount of bound rubber and is superior to other commercial rubber grade carbon blacks in its effect on abrasion resistance. The effect on properties of simultaneously varying the black and softener level in GR-S-1500 is discussed.

Laboratory and factory data show SAF black is somewhat more difficult to process than HAF black. Tire tests have shown that SAF black imparts in excess of 40 percent better tread wear than HAF black when properly compounded. In natural rubber this new black offers superior cut and crack growth resistance. SAF black is superior to acetylene black in electrical conductivity and this superiority is most pronounced at low loadings.

Thursday Morning—May 28

Joseph L. Haas, Presiding

9:00 A.M.—10—The Effect of Carbon Black on the Oxidation of Unvulcanized Cold Rubber. *F. Lyon, K. A. Burgess, and C. W. Sweitzer (Columbian Carbon Co., New York, N. Y.). (Paper will be presented by Mr. Lyon).*

Previous work has shown that the oxidation reactions of statistically heated unvulcanized cold rubber and natural rubber films are inhibited by carbon black. The present study extends these investigations to the effect of carbon black on Banbury-mixed cold rubber stocks, to the correlation of oxygen uptake at elevated temperatures with the gelation of carbon black-cold rubber films, and to the action of carbon black on the benzoyl peroxide gelation of cold rubber.

Carbon black-cold rubber stocks were mixed in the Banbury under the same time and temperature conditions found necessary to develop in the raw polymer the amount of gel previously developed by static heat treatment. In these Banbury-mixed stocks carbon black was found to inhibit the oxidation reactions, i. e., gel formation, to the same degree as the static heat method.

The oxygen uptake was determined on gum and black cold rubber films cast from benzene solutions. The carbon black was colloidally dispersed in the black films. The oxygen uptake at elevated temperatures was measured by a volumetric method and the results compared to the gelation effects produced in identical films under the same temperature treatment. A good correlation between oxygen absorbed and gel formed was obtained, with the inhibiting effect of carbon black on oxygen absorption proportional to its inhibiting effect on the gelation reaction.

When the oxidation of cold rubber is carried out with benzoyl peroxide in an oxygen free atmosphere carbon black accelerates rather than inhibits gel formation. In natural rubber films under the same conditions carbon black suppresses the formation of polymer gel.

The profound effect of carbon black on polymer oxidation reactions is shown to be influenced by the type of polymer, by the type of oxidizing treatment, and by the chemistry of the carbon surface.

9:20 A.M.—11—Oxidation and Antioxidant Action in Rubber Vulcanizates. *J. Reid Shelton and William L. Cox (Case Institute of Technology, Cleveland, Ohio). (Paper will be presented by Mr. Cox).*

Oxidation studies at different partial pressures of oxygen in combination with nitrogen show that the variation of the rate of oxygen absorption in the constant-rate stage with the oxygen concentration involves both a square root and a first power term, with the latter being negligible in some cases. Rate data for all the stocks studied, including variations of accelerator type, carbon loading, antioxidant type, and antioxidant concentration, can be correlated on the basis of the same rate equation.

A mechanism for the oxidation of rubber which includes a probable mechanism of antioxidant action has been developed in which the antioxidant is considered to be capable of functioning in more than one way. The proposed mechanism is consistent with the kinetic data, as well as offering possible explanations for such "anomalous" facts as the existence of optimum antioxidant concentrations, the catalysis of light-activated oxidations by substances which are antioxidants in the dark, the difference in effectiveness of phenols and amines in gum and black stocks, and the role of carbon black in the oxidation.

9:45—12—Migration of Materials Between Samples in Accelerated Aging Ovens. *R. N. Thomson and N. S. Grace (Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont., Canada). (Paper will be presented by Mr. Thomson).*

An examination has been made of some effects of interaction between test-pieces undergoing accelerated aging in conventional aging ovens. Migration of material occurs when vulcanizates compounded to different recipes are aged together, and the relative effect of one compound upon another may alter when aged together at different temperatures. Further, the oven itself may become contaminated, the apparent resistance to accelerated aging of a particular vulcanizate then being influenced by the composition of test-pieces previously aged in the oven.

Interaction is much reduced if the air is exhausted from the oven after a single pass over the test-pieces, even if these are in close proximity. Complete protection from this source of error is, of course, achieved by aging different compounds in separate isolated containers, each provided with its own air supply, and some of the published test methods incorporating this principle are discussed.

A simple apparatus for converting existing air circulating laboratory ovens for isolated aging of eight or more different compounds is described.

10:10 A.M.—13—Heat Aging Characteristics of Chlorosulfonated Polyethylene. *Ward J. Remington (Polychemicals Department, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.).*

Chlorosulfonated polyethylene, being a chemically saturated elastomer, possesses excellent resistance to attack by such agents as oxygen, ozone, and oxidizing acids. By virtue of this chemical stability, chlorosulfonated polyethylene has also proven to have good resistance to degradation during aging at elevated temperatures. Outstanding heat resistance is obtained by the addition of selected antioxidants.

The elastomer is conventionally cured with metal oxides, preferably litharge or magnesia. The heat degradation of vulcanizates cured with litharge is characterized by a loss of tensile strength and elongation, but the initial hardness and stiffness values remain substantially unaffected. Vulcanizates cured with magnesia are superior to those cured with litharge in tensile strength both before and after heat aging, but aging is characterized by an increase in hardness and stiffness values. The best over-all resistance to heat degradation was obtained by curing chlorosulfonated polyethylene with a mixture of litharge and magnesia. The preferred vulcanizates remained flexible and retained elongation values of about 100% after exposure for six to eight hours at 200° C. (392° F.), ten days at 150° C. (302° F.), or more than twenty-eight days at 125° C. (257° F.).

Extrapolation of the test data leads to the prediction that the service life of chlorosulfonated polyethylene at 125° C. may be expressed in terms of months, and at 100° C. the service life may be measured in years.

10:30 A.M.—14—The Structure of Neoprene. VII. Infrared Analysis of Configuration. *J. T. Maynard and W. E. Mochel (Chemical Department, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.). (Paper will be presented by Mr. Maynard).*

A study of the infrared absorption spectra of polychloroprenes made at temperatures ranging from —40° C. to 100° C. has made possible identification and estimation of the major structural features of these polymers. It is confirmed that 1,4 polymerization of chloroprene accounts for the greatest part of the structure of all neoprenes, ranging from 99% in —40° C. polymers to ca. 84% in 100° C. polychloroprenes. Of this 1,4 polymer only a small fraction has the *cis* configuration. This proportion increases from less than 5% in —40° C. polymer to ca. 13% in 100° C. polymer.

Small amounts of branched structures that result from 1,2 and 3,4 polymerization are observed. These also increase in concentration with higher polymerization temperatures but do not account for more than 2.5% each even in 100° C. polychloroprenes. The portion of these polymers unaccounted for by these observations amounts at the most to 10% in 100° C. polymers. It is suggested that this part of the structure is that formed by hydrolysis and/or rearrangement of a part of the tertiary allylic chloride units which result from 1,2 polymerization of chloroprene.

It is shown that only 50% of an acid-catalyzed ionic polychloroprene can be accounted for by structures recognized in free-radical polychloroprenes.

10:50 A.M.—Business Meeting.

11:15 A.M.—15—Chemigum SL—An Elastomeric Polyester-Urethane. *N. V. Seeger, T. G. Mastin, E. E. Fauser, F. S. Farson, and E. A. Sinclair (Research Division, Goodyear Tire & Rubber Co., Akron, Ohio). (Paper will be presented by Mr. Seeger).*

Chemigum SL is an elastomeric polyester-urethane made by condensation polymerization of a low molecular weight polyester adipate with a diisocyanate. A high polymer results having a molecular weight in the range 20-50,000. It is a processible raw gum which has many of the processing characteristics of pale crepe rubber. Intrinsic viscosity ranges from 1.0 to 2.0; gel from 0 to 10%. The effect of the molar ratio of diisocyanate to polyester (R value) on sol-gel, plastic flow, softening point and Mooney will be discussed.

Starting materials for the polyester are usually ethylene glycol, propylene glycol and adipic acid. Many variations in the type and amounts of glycols and dibasic acids are possible in the polyester fragment of the polymer. The polyester in turn can readily be chain extended with one or more of several diisocyanates preferably derived from benzidine, 1:5 naphthalene diamine, 4:4′ diamino-diphenyl methane, and 2,4 tolylene diamine.

Usually di and/or polyisocyanates serve as curing agents and usually are added on the mill. Cured blends are possible with natural rubber, GR-S, and neoprene. Since the raw gums are readily soluble in methyl ethyl ketone, chlorinated aliphatics and esters, they lend themselves to cement compounding and find use as protective coating on rubber, plastics and fabrics. A solution of Chemigum SL sprayed on the surface of rubber or plastic gives an inherent, flexible and scuff-resistant coating which is at the same time resistant to sunlight, ozone, and general weathering.

A typical gum vulcanizate has the following properties: tensile 5000 lbs./sq. in., elongation 750%, abrasion resistance twice as great as the best cold rubber, excellent heat resistance, outstanding oxidation resistance, and oil resistance equivalent to neoprene. Cured physicals are similar to Vulcollan.

Potential uses include wear-resistant tread veneers on pneumatic tires. Solid tires made from Chemigum SL have given service four to five times longer than conventional solid tires. Soles, heels, belt surfaces, floorings, etc., may be protected by localized application of wear-resistant SL's.

11:45 A.M.—16—Compounding Neoprene for Increased Resistance to Water. *C. E. McCormack, R. H. Baker, and R. S. Graff (Rubber Chemicals Div., E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.). (Paper will be presented by Mr. McCormack).*

Both laboratory tests and field experience have shown that conventional neoprene compounds have adequate water resistance for most types of service. Increased water resistance results from (1) the use of red lead as the vulcanizing agent and (2) the use of fillers such as hydrated calcium silicate or fine particle silica in compounds containing zinc oxide and magnesium oxide as the vulcanizing agents.

Tests have shown that compounds containing red lead possess sufficient processing safety to be applicable to most factory operations. The water resistance of these compounds is influenced by the amount and type of filler. Certain types of carbon black give the best results and calcium carbonate the poorest. Zinc oxide-magnesium oxide compounds containing either hydrated calcium silicate or fine particle silica differ from all other compounds tested in that their swelling curves go through a maximum. This may be of value in designing compounds for extra severe service. Data are presented on the effect of temperature in the range of 25° to 121° C. on the swelling characteristics of many neoprene compounds.

The relationship between distilled water and various aqueous solutions as the swelling media for neoprene stocks has been investigated and it is shown that distilled water is the most severe and that for the solutions studied, swelling varies inversely with the concentration. Some comparisons of various neoprenes with natural rubber and GR-S are shown.

Friday Morning—May 29

Alan W. Bryant, Presiding

9:00 A.M.—17—Fundamental Low Temperature Retraction Studies of Natural and Synthetic Elastomers. *L. J. Radi and N. G. Britt (Research Laboratories, Interchemical Corp., New York, N. Y.). (Paper will be presented by Mr. Britt).*

The low temperature retraction behavior of various elastomers was observed over a wide range of temperatures. Contrary to the more common type of retraction test (T-R), in which retraction is measured at continually rising temperature, retraction was measured at constant temperature, and the percent retraction plotted against the temperature at which retraction occurs.

The resulting curves were typically sigmoid for GR-S, but it was found that almost all other elastomers exhibit a deviation from the sigmoid norm. Evidence is presented to show that the magnitude of this deviation or "dip" is an indication of the rate at which crystallization is occurring at a specific temperature. The magnitude of deviation can be radically altered by modification of the polymer and even by compounding variations.

The temperature of maximum deviation has been designated as T_d and was determined for several elastomers. T_d was observed to fall in a fairly narrow range (—35 ± 5° C.) for all elastomers and was not appreciably affected by polymer modification or compounding variations. T_d is believed to represent optimum thermal conditions for crystallization.

The magnitude of deviation or "dip" is shown to be of value in following polymer and compounding modifications to achieve maximum resistance to crystallization, while T_d serves to indicate the temperature most favorable to crystallization and most to be avoided in storage.

9:20 A.M.—18—Determination of Particle Size Distribution in GR-S Latices. ***A. Nisonoff, W. E. Messer, and L. H. Howland (Naugatuck Chemical Division, U. S. Rubber Co., Naugatuck, Conn.). (Paper will be presented by Mr. Nisonoff).***

A method based on Stokes' Law, involving the use of an ordinary laboratory centrifuge, is described for the determination of particle size distribution in GR-S latices. It was shown to be valid by tests for reproducibility, and by comparison with the results of light and electron microscopy. In applying the method, several unusually fluid high-solids latices made in the pilot plant were found to be characterized by a wide distribution of particle sizes. Data on various latices in plant production are reported. The technique was used to study the mechanism of formation of the very large particles which constitute the cream which is formed in some "cold" high-solids latices.

9:45 A.M.—19—Rheology of Latex and Latex Compounds. ***Louis Leaman (Magic Chemical Co., Brockton, Mass.).***

The rheological properties of latex systems are of importance in their industrial applications. Many practical methods are used for controlling or varying flow properties. The flow behavior of latex systems must be explained in the light of their colloidal properties. Of utmost importance are the conditions existing at the interface between the dispersed particle and the serum. Rheological properties are also closely related to colloidal stability. Studies in the writer's laboratory show the value of determining rheological properties with a rotating cylinder (Couette) type viscometer. Flow curves, or rheograms, are very helpful in control work and product development. Typical rheograms are illustrative of the various problems encountered in the latex laboratory.

All types of rheological behavior are exhibited in latex systems. For purposes of studying the physico-chemical principles involved, this work may be divided into two parts: (1) uncompounded latices, and (2) latex compounds. In uncompounded latices, a gradual change in flow properties may be traced as the concentration of elastomer is varied. Two types of additives may be present in latex compounds: (1) Those used to control the rheological properties, and (2) those used to impart desired properties in the end product of the manufacturing process. Additives of the second type may also produce rheological effects.

10:10 A.M.—20—A Paper Dip Method for Measuring Wet Gel Strength of Coagulant Dipped Films. ***A. I. Medalia and H. B. Townsend (Boston University, Boston, Mass.). (Paper will be presented by Mr. Medalia).***

A property of latex which is considered of fundamental importance in the latex industry is the so-called wet gel strength. This term connotes the tensile strength of the freshly set film, but hitherto there has been no adequate method of measurement of this property, since the film is so weak that it cannot readily be removed from the surface on which it is deposited.

The present method is based upon the use of absorbent paper of low wet strength, impregnated with calcium nitrate, as a base for the deposition of a latex film. The strip of paper, which may be in a dumbbell shape, is dipped for 30 seconds and then removed from the latex, together with the adhering coagulant dipped film. This film is rinsed in water and then mounted on a special tensile testing machine designed for high elongation and low tensile. Elongation and tensile are measured at a standard rate of jaw separation of 20 inches per minute.

These properties have been studied using natural and various synthetic latices. The effects of pre-vulcanization, compounding and dilution of these latices have been determined. Tensile properties of the film from a given latex have also been measured as a function of the time and conditions of drying of the film after deposition.

10:30 A.M.—21—Aging Stability of Neoprene Latex. ***D. E. Andersen and R. G. Arnold (Jackson Laboratory, E. I. du Pont de Nemours & Co., Wilmington, Del.). (Paper will be presented by Mr. Andersen).***

The most important cause of aging instability in neoprene latex is the slow appearance of hydrochloric acid in the aqueous phase. This acid destroys an alkaline reserve and eventually attacks the protective emulsifying agent. At ordinary temperatures these reactions occur over approximately an eighteen month period before irreversible coagulation appears. During this time the pH of the latex decreases and at some point previous to flocculation the latex cannot be compounded satisfactorily unless its pH is again raised with sodium hydroxide.

A study was made of the rate of HCl appearance at 90° C. in Type 571 Neoprene Latex, and the changes in the composition of the aqueous phase which result. A method for predicting the storage life of a latex, with or without added caustic, is developed using the rate of acid appearance and a graph showing the changes in composition which are tolerated by the latex. The use of this information in practical application, and the difficulties involved, are also discussed.

10:55 A.M.—22—Titer Compounding of Neoprene Latex. ***G. S. Cook and J. C. Fitch (Rubber Chemicals Div., E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.). (Paper will be presented by Mr. Cook).***

All latices become less stable upon aging. This decreased stability becomes a problem long before spontaneous coagulation of the latex occurs. Generally, it is first manifested in a decreased stability toward compounding which is characterized by thickening, flocculation, or coagulation occurring either immediately upon or shortly after the addition of compounding ingredients. With neoprene latex, this loss of stability upon aging has been shown to be related to a reduction in alkalinity.

Data are presented which show that the titer of the latex to pH 10.5, obtained by titration under controlled conditions, has considerable practical value in the formulation of neoprene latex compounds. Experiments are described which show that proper adjustment of this titer results not only in improved stability of neoprene latex compounds but also, when applied to uncompounded latex, can serve as a basis for extending its useful life.

11:15 A.M.—23—The Relation Between Soluble Polymer in Chloroprene Monomer and the Mechanical Stability of Neoprene Latex. ***N. G. O'Brien, J. R. Goerts, and R. A. Hammond (Rubber Chemicals Div., E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.). (Paper will be presented by Mr. Goertz).***

It has been observed that when neoprene latex is submitted to mechanical action, a small portion may coagulate. Because of this partial instability, coagulation sometimes occurs in lines and tanks during transfer of the latex.

It was shown that soluble polymer in chloroprene monomer, formed during storage, gives rise to the unstable particles in latex emulsion through the following mechanism: During emulsion polymerization the monomer diffuses from the dispersed droplets into soap micelles where polymerization takes place. The polymer particles thus formed have a diameter of about 0.1 micron. Any soluble polymer, formed during storage of monomer, cannot diffuse from the droplets and is left behind as skeletal residues. These residues can be several hundred times as massive as normal polymer particles. Because of size they are more likely to form coagulum upon collision with other particles.

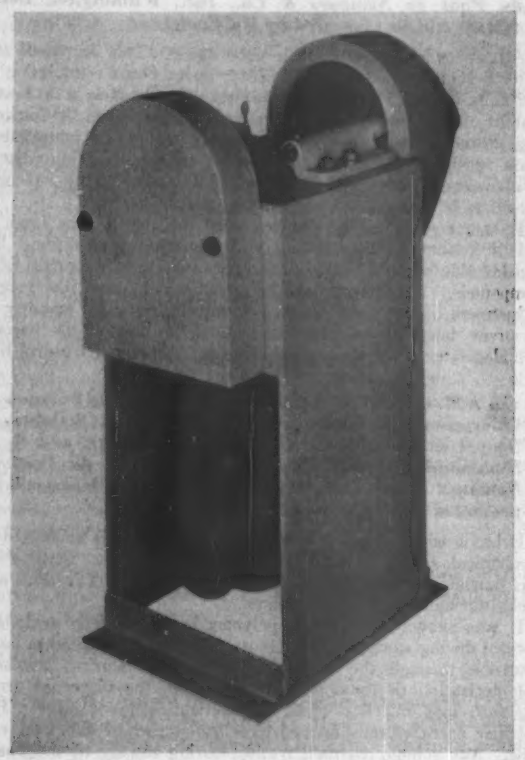
Quantitative experimental evidence to support this mechanism has been obtained. Furthermore, a dye tracer technique has provided visual confirmation. It has been demonstrated that the stability of polymer dispersions can be improved by reducing the concentration of soluble polymer and by increasing the degree of monomer emulsification. The results of this work have been applied to improve the manufacture of neoprene.

The Care and Use of Analytical Balances. Christian Becker Division, Torsion Balance Co., Clifton, N. J. 5¼ x 7¾ in.

As indicated by its title, this handy, pocket-size booklet contains information on the care and use of analytical balances. Data on how to choose the proper location for the balance and how to assemble and mount it is given, while other sections include information on the historical development of precision weighing and a discussion of the techniques applied in determining weight and checking sensitivity and operation of a balance. General precautions to be observed in the care and use of balances are given.

Goodman Rubber Slug Cutter

Rubber slugs, from the tiniest to 3 inches in diameter and 4 inches in length can be produced from extruded stock by the Model 3-4 Rubber Slug Cutter produced by G. F. Goodman & Son, Philadelphia 25, Penna. A complete range of cutting speed is provided to deliver from 100 to 1800 slugs per minute. A rugged spring loaded work stop, easily adjusted, is said to give excellent control of slug length. A jackshaft flywheel generates a smooth flow of power to the cutter head permitting a relatively small motor to easily handle the heaviest cuts in tough stock. Moving parts are amply protected for operator safety and a shear pin hub is provided to prevent damage to the machine in case of a

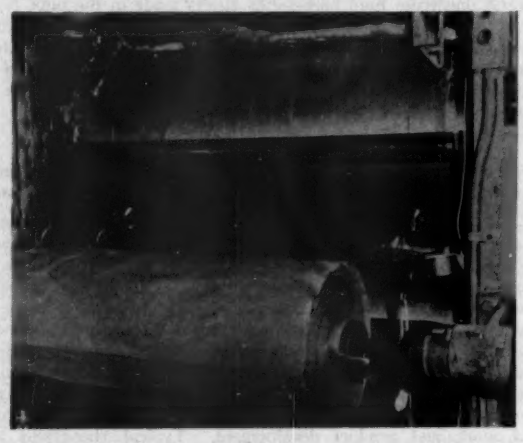


destructive overload. A separate motor driven power feed device, with variable speed to cover all feed requirements, is available as an extra attachment. The unit has the following specifications: Stock capacity, ¼ to 3 inch diameter; slug length capacity, ¼ to 4 inches long; spindle speed, infinitely variable from 100 to 900 rpm; delivery rate, 100 to 900 slugs per minute (single blade), 200 to 1800 slugs per minute (double blade); motor, 1 hp, totally enclosed, ball bearing; starting switch, manual; cutting blades, hardened toolsteel; stock feed bushings, set of nine furnished with standard machine; spindle, carbon steel; spindle bearings, heavy duty tapered roller bearings; height, 46 inches; length, 33 inches; width, 19 inches; weight, approximately 1,100 pounds.

A new line of **Standard Duty Safety Switches** announced by the Trumbull Electric Department of the General Electric Co., Plainville, Conn., is available in ratings of 30, 60, 100 and 200 amperes, 240 and 600 volts, two, three and four poles.

Knives for Rubber Sheeting

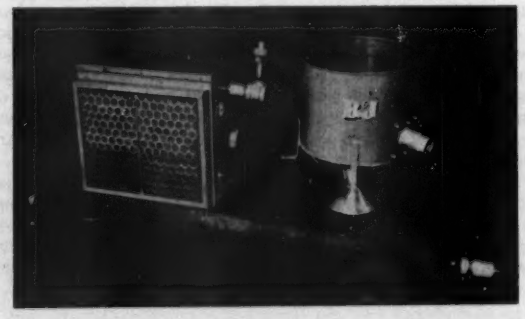
A New England rubber sheeting manufacturer has reduced his maintenance expense by using nylon circular knives for slitting rubber sheet on steel calender rolls. The knives are used to trim selvage edges and cut different widths from rubber sheeting varying in thickness from .005 to .175 inches. The blades are cut from 2½ inches diameter "Polypenco" nylon rod sup-



plied by the Polymer Corp. of Pennsylvania, Reading, Penna. They are tapered from the hub to the cutting edge at the outside diameter. Although the nylon knives require more frequent sharpening than the steel knives, they do not mar or injure the large steel rolls. This application has cut downtime to a minimum and eliminated the high cost of overhauling or replacing the steel calender rolls.

Ball & Jewell Heater-Dryer

Easily installed on top of any injection molding machine or extruding machine, the Heater-Dryer manufactured by Ball & Jewell, Inc., 22 Franklin Street, Brooklyn 22, N. Y., conditions, dries, and pre-heats the material after it is put into the hopper. In operation, air is drawn through the large, thick fiberglas filter, removing dust or dirt. The clean air passes through the blower, then through a thermostatically controlled heater, through the flexible hose into the hopper attachment to a heat spreader at the bottom of the machine



hopper. The heat is distributed at its greatest intensity directly above the plasticizing cylinder. This air, heated to temperatures up to 235° F., removes moisture and preheats the material. The new round design of the hopper attachment eliminates dead spots; circulation of the heated air is thorough and complete.

Editorials . . . . . .

Realistic Prices

THE footnote devoted to "unrecovered costs" of the synthetic rubber facilities to the American public which appeared in the recent recommendations made by the Reconstruction Finance Corporation to the President and Congress on the disposal of these facilities, reference to which was made in these columns last month, continues to hold a fascination. It will be recalled that the footnote in question outlined costs which are not reflected in the net book value of $172,600,000 applied to the remaining 29 government-owned plants and indicated that if all actual costs were included the unrecovered cost to the American people of the synthetic rubber facilities as of December 31, 1952, amounted to $446,400,000.

Some natural rubber circles have built up quite a case around these figures (a review of which is not possible due to space limitations) and have advanced the argument that a good portion of this "unrecovered cost" could be recovered by the American Government within the next 18 months or so, or until the facilities were turned over to private industry, by an immediate increase in the price of GR-S. Some quarters have even suggested an advance from the present pegged price of 23c a pound to 26c a pound. It will be recalled that a 26c figure has been termed more "realistic" based on actual production costs which would have to be borne by private industry, including advertising and sales expense.

A further reading of the footnote in the RFC disposal report, combined with some additional figures supplied in the report plus some simple arithmetic, could easily lead one to the conclusion that the present price of 23c a pound for GR-S is completely within the realm of reason. For instance, as previously stated, the RFC report indicated that the unrecovered capital investment including all interim capital additions applicable to the 29 remaining facilities amounted to $172,600,000 (net book value) at the end of 1952. Current rates of depreciation on these 29 facilities will probably reduce the public's unrecovered capital investment (after allowing for expected capital additions) to about $150,000,000 by the end of the current year and to about $120,000,000 by the end of 1954 when the plants may be in the hands of private industry. Meanwhile, profits are being realized at a rate in excess of $50,000,000 anually based on current costs of materials, conversion costs including depreciation, maintenance of standby facilities, etc., and on the selling price of 23c a pound.

If, on the other hand, we accept the full $446,400,000 as the "unrecovered cost" as of December 31, 1952, even this figure is not too imposing if we use some more arithmetic. This figure will be reduced at the rate of approximately $75,000,000 annually so that the remaining unrecovered capital investment of the American people will be reduced to about $375,000,000 by the end of the current year and further reduced to about $300,000,000 by the end of 1954. Since the likelihood of the government in recovering about $300,000,000 in the long range from the sale of the 29 facilities involved is fairly good, despite the talk of plant obsolescence, the American public may still recover its full war-time investment in the synthetic rubber program. What other government investment made under war-time emergency is in the same position?

We will be the first to admit that the above calculations are open to considerable argument. Given the exact same sets of figures, two accountants can readily come up with two answers poles apart. However, the arithmetic is there, and since the figures are based on the current profit margin of government synthetic rubber they tend to dispel the allegation that 23c a pound is an inadequate price based on current costs. Whether that price is "realistic" insofar as private industry is concerned is another matter. Here, again, we encounter accounting methods and special interests.

There is little doubt that an increase in the price of GR-S would be of immediate benefit to natural rubber producers who are beset with numerous problems due to the current low price of natural rubber. There is some doubt, however, that it would be as advantageous as some natural rubber circles indicate. In any event, facts are still facts, and on the basis of the figures outlined above it would appear that the present 23c per pound is a reasonable price for GR-S.

NEWS OF THE MONTH

PRESIDENT EISENHOWER RECOMMENDS DISPOSAL OF GOVERNMENT-OWNED SYNTHETIC FACILITIES

PRESIDENT Eisenhower, on April 14th, recommended to the Congress prompt enactment of legislation for the sales to private interests of government-owned synthetic rubber plants. Adopting the general outlines of the disposal program recommended to him by the Reconstruction Finance Corporation, the President also called for safeguards in the legislation to insure fair competition in the interests of the consuming public and of small and large rubber producers. "To insure against the hazards of unforeseeable contingencies, the facilities must be sold on such terms as will guarantee their ready availability for the production of synthetic rubber in time of emergency," he said.

In his message the President said in part: "I am in hearty accord with the policy determination of the Congress that the security interests of the nation will best be served by the development within the United States of a free competitive synthetic rubber industry, and I believe that now is the time to undertake plant disposal.

"The nation's security in its rubber supply is, of course, of paramount importance in any consideration of the disposal of these facilities. For such security, two things are essential, namely, an adequate stockpile of natural rubber and a healthy, progressive synthetic rubber industry.

"Our stockpiling objectives are adequate and have been virtually achieved and from the economic and technological data available to me, I am confident that if the government-owned synthetic rubber facilities are sold as recommended, competitive private industry will amply, efficiently and economically supply our synthetic rubber requirements."

No Legislation Suggested

While the President thus gave his approval to the RFC recommendations, he did not attach to the message suggested legislation to be enacted by Congress. He said that it was his belief "that such legislation would most appropriately result from the joint efforts of representatives of the interested executive agencies and those committees of the Congress having this matter under consideration".

According to reports from Akron, manufacturers are convinced that it would be a mistake for Congress to fix a price tag on the plants. Rather, they would like to see the plants put up for sale on a negotiated basis. A negotiated price basis would require submission of bids from all interested parties.

One official stated that on a fixed price tag by Congress, it is extremely doubtful whether all the companies now in the business would want some of the properties. The biggest factor that would work against the success of a fixed price sale, he added, is the element of economy.

Some plants, located near sources of supply or near markets, are more economical to operate than others. These would be in greatest demand. Others might not find takers unless the price is extremely favorable, he reasoned.

As soon as the President's recommendations had been received, Congress set out to get a detailed plan together for the disposal of the facilities. Senator H. Capehart (Rep., Ind.), chairman of the Senate Banking Committee, said that his staff is drawing up a bill in cooperation with executive agencies. Senator Capehart planned to have the measure ready for introduction in the Senate very shortly.

In the House of Representatives, Representative Paul Shafer (Rep., Mich.), chairman of the Armed Services Subcommittee, will sponsor the Administration's rubber disposal program. However, it was said that the House version would not be introduced until Mr. Shafer returns from the International Rubber Study Group Conference which was scheduled to start on May 11 in Copenhagen.

Earlier, however, Mr. Shafer amended his thinking somewhat on the question of a disposal price. Following a Congressional inspection of rubber plants in Akron, Baton Rouge, La., and Houston, Texas, Mr. Shafer said that the asking price for the synthetic plants should be $300,000,000. In February, Mr. Shafer had set a pattern for Congressional and White House thinking in a speech mentioning $350,000,000 for the plants.

Mr. Shafer also stated that he does not believe national defense requires writing a "recapture clause" into bills of sale for the synthetic plants. A privately-owned synthetic rubber industry, he said, can be depended on for an all-out response to emergency needs as much as any other private industry.

Meanwhile, RFC announced that March sales of synthetic rubber had reached 76,146 long tons, some 10,000 tons higher than the previous monthly peak. The government agency also announced that it plans no reduction in the price at which it sells synthetic rubber. E. D. Kelly, Director of the Office of Synthetic Rubber, said "we contemplate no price change—either up or down."

Mr. Kelly said there is no reason to expect a drop in consumption of synthetic rubber through a mass switch by consumers to natural rubber. The consuming industry, he declared, is pretty cautious in changing its usage from one type of rubber to another for price reasons. The price of natural rubber would have to remain below that of synthetic for several months before there would be any switch in substantial volume, Mr. Kelly declared.

A pertinent comment on the effect of government controls on industrial research came from another quarter during the period. Roy C. Hackley, Jr., vice-president in charge of patents and licensing for the Houdry Process Corp., in an address before the Philadelphia Patent Law Association, cited his company's experience in the synthetic rubber program.

Cites Past Experiences

Prior to World War II, Houdry initiated a research program to investigate methods of producing butadiene, he said. By 1942, Houdry had developed a catalytic dehydrogenation process capable of converting refinery cracking gases into butadiene. Two plants employing this process were built during the war for Rubber Reserve.

Throughout the war and until 1948, all information pertaining to the Houdry butadiene process was top secret. Patent applications were held by the government under secrecy and not issued until 1948. Similarly, Rubber Reserve, which owned all butadiene plants, held up the release of operational information on these installations. Interest of private companies in the Houdry process was further discouraged by the bi-statute right of the government to buy at its own figure any or all butadiene produced. Hence, there was no inducement for private industry to risk investment in this field, Mr. Hackley stated.

Butadiene research also suffered, primarily as a result of the unrealistically low royalty rate of one-eighth cent per pound which the government paid on all

butadiene produced. This sum was divided among all companies that contributed to the technological development of butadiene. Mr. Hackley stated that almost five years after the war, the Houdry Process Corp. had recovered about $85,000 net on a total investment of approximately $800,000. In view of these policies, it is not surprising that since the war there has been a complete cessation of research and patents on the manufacture of butadiene—a grim tribute to the effect of socialization on scientific research, he opined.

In surveying the future, Mr. Hackley concluded that a rapidly expanding civilian market coupled with the imminent prospect of governmental decontrol should attract private industry into the synthetic rubber field and thereby stimulate competitive research to further processing improvements.

The aforementioned International Rubber Conference was expected to attract representatives from eighteen nations to consider a report by the "working party" of the International Rubber Study Group to achieve stabilization of the rubber market through a "buffer stock" plan. Many rubber industry officials from the United States have left this country (at this writing) for Denmark to attend the conference, and some in pre-sailing statements declared their opposition to any buffer stock arrangement.

Harvey S. Firestone, Jr., chairman of the board of the Firestone Tire & Rubber Co., said, for example, that the best assurance of a continuing and stable market for natural rubber producers is the maintenance of a policy of allowing their products to sell at competitive prices with synthetic rubber, and of increasing their yields and improving the quality of the product. The adoption of a commodity agreement such as the buffer stock scheme, he said, would not give producers the economic assurance they want.

William O'Neil, president of the General Tire & Rubber Co., lashed out at rubber speculators and "price peggers." With disposal of the government synthetic plants imminent, he declared, and taking into account the tremendous strides in synthetic rubber by private industry, the time has arrived when both rubber companies and producers are no longer faced with the gamble of the plunging and skyrocketing price structure of natural rubber.

Indonesia Offers Suggestions

Indonesia, meanwhile, has urged the United States to manage any disposition of the synthetic rubber plants so as not to upset the natural rubber industry, on which the Asian republic depends for a living. On May 4, Dr. Ali Sastroamidjojo, Indonesian Ambassador, called at the U. S. State Department to suggest that the sale of the synthetic plants could be either "beneficial or damaging" to the economy of his country.

After a conference with Walter Robertson, Assistant Secretary of State for Far Eastern Affairs, the Ambassador issued a statement saying his government had no wish to interfere with "plans of the United States Administration and Congress." However, he added that, "in the spirit of international cooperation," he had made some suggestions to the department.

His proposals included selling the synthetic rubber plants in such a way as to provide "fair competition" between the synthetic and natural rubber industries; selling the synthetic plants at a "realistic price"; discontinuing the "highly subsidized production of alcohol-base synthetic"; and "early initiation" of government stockpiling of synthetic.

It was understood that one factor prompting the Ambassador's visit was a fear based on rumors that the government was prepared to sell its synthetic rubber plants at a depreciated book value, representing only a fraction of the original cost, and far below what the Indonesians feel would be their actual "value."

Indonesian sources also hold that the RFC price for synthetic rubber is "unrealistic," and that it should be increased as a business matter. The present "low price," these sources maintain, has already brought about an annual loss of $180,000,000 to Indonesian rubber producers.

EARNINGS OF THE "BIG FOUR" IN 1952 AS COMPARED WITH 1951 EARNINGS

A summary of the earnings of the "Big Four" in 1952 has been compiled by the Natural Rubber Bureau and compared with 1951 earnings of the same companies. It will be noted from the summary, shown below, that two of the firms reported greater net sales in 1952 than in 1951, but only one reported larger profits. Firestone showed the largest percent of profit on sales, 4.5%. The summary follows:

		Goodyear	*Firestone**	*U. S. Rubber*	*Goodrich*
Net Sales	1951	$1,101,141,392	$975,766,455	$837,222,092	$637,722,241
	1952	1,138,403,608	965,364,427	850,151,566	624,102,207
Net Income After Taxes	1951	36,628,296	48,398,950	30,366,449	34,742,881
	1952	39,009,866	43,081,717	28,169,955	32,364,008
Earned per Common Share	1951	$7.75	$12.26	$4.76	$8.15
	1952	8.30	10.89	4.33	7.60
% Profit on Sales	1951	3.3%	5.0%	3.6%	5.4%
	1952	3.4%	4.5%	3.3%	5.2%

*Fiscal year ended October 31, 1952

Hercules Forms New Laboratory

The establishment of a new sales-service laboratory to provide additional technical assistance to the protective coatings industry has been announced by the Cellulose Products Department of the Hercules Powder Co. The new laboratory is located at the company's Experiment Station in Wilmington, Del. It now will be possible for Hercules to expand present facilities for providing direct technical service to customers on both the manufacture and use of protective coatings based on nitrocellulose, ethyl cellulose, cellulose acetate, and chlorinated rubber. In addition to providing technical assistance in the laboratory, Hercules representatives will be available to visit individual plants. The laboratory will be under the direction of James R. Yeager, manager market-development coatings, Cellulose Products Department. Rufus F. Wint will act as coordinator and Gregory N. Bruxelles as supervisor of the laboratory.

URW Asks T-H Amendments

In a recent appearance before the House Labor Committee, G. L. Patterson, general counsel to the United Rubber Workers, C.I.O., called for five amendments to the Taft-Hartley law. He also urged keeping some provisions as they are now. Mr. Patterson called for these amendments: (1) Repeal of the non-communist oath. He pointed out that a recent Labor Board ruling in favor of the URW had been thrown out because the national CIO had not complied with the oath even though the URW and its locals had done so. (2) Killing the exemption for workers in states with laws that contradict Taft-Hartley. For example, several rubber plants do not have the union shop because of state laws outlawing the company-wide contract. (3) Killing the provision allowing 30% of the employees in a bargaining unit to force a union shop election during the life of the contract. (4) Changing the right of craft unions to "carve craft units out of existing industrial units" so as to consider the history, degree of union representation, and stability of the workers affected. (5) Freeing the union from damages incurred by individuals promoting wildcat strikes, when the union has acted to try to stop the strike.

Plan 6th National Plastics Show

The Sixth National Plastics Exposition will be held the week of June 6, 1954 at Cleveland, Ohio, in the Cleveland Auditorium, sponsored by the Society of the Plastics Industry, Inc. All branches of the plastics industry will exhibit at the 1954 exposition: molders; laminators; extruders; reinforced plastics products manufacturers; film, sheeting and coated fabrics processors; raw material suppliers; machinery and equipment manufacturers; tool, die and mold makers; and other components of the plastics industry. Exhibits will be on one level for the convenience of the visitors and also for ease of installation. The Sixth National Plastics Exposition will be open to representatives of business, industry and the military.

SYMPOSIUM ON MOLDED GOODS FEATURES ASME RUBBER-PLASTICS MEETING

A symposium on industrial rubber molded products featured the meeting of the Rubber and Plastics Division of the American Society of Mechanical Engineers which was held at the Deshler-Wallick Hotel in Columbus, Ohio, on April 28 and 29. The meeting, held in conjunction with the regular Spring Meeting of the parent society, covered the presentation of ten papers in all, six on plastics and four on rubber. Attendance at all sessions was satisfactory, numbering well over 100 at each session.

The symposium on molded goods included three papers as follows: (1) Progress in Manufacturing Methods in the Molded Rubber Products Industry, by J. H. Gerstenmaier and J. H. Fetter, Goodyear Tire & Rubber Co., St. Marys, Ohio; (2) Product and Mold Designing for Lower Ultimate Cost, by John Mason, Firestone Industrial Products Co., Noblesville, Indiana; (3) Product Engineering, by Howard H. Armstrong, B. F. Goodrich Co., Akron, Ohio. Spirited discussion followed the presentation of papers, with questions raised from the floor answered by all three participants. Stewart Brams, of the Dayton Chemical Products Lab., Inc., and Stephen Palinchak, of the Battelle Memorial Institute, acted as chairman and vice-chairman, respectively, at this session.

Molded Goods Production

Opening the symposium, Mr. Gerstenmaier pointed out that molded rubber and rubber-to-metal products are being produced in large volume at relatively low costs, to close tolerances, and with wide varieties of compound characteristics. He traced with slides the numerous steps involved in the production of typical molded goods, dwelling on the intricacies of mold making and the various types of finishing equipment available to the industry. He stressed the point that frequently profits are lost in the all-important finishing operations, and urged rubber manufacturers to pay more attention to such operations in pricing their products.

In concluding, Mr. Gerstenmaier said that the use of molded rubber products as functional parts in all industrial fields, plus the development of varied specialized machinery and techniques used exclusively for manufacturing molded products, has made molded rubber a separate division of the rubber industry.

In the second paper, Mr. Mason emphasized the fact that the engineer can make a real contribution toward more economical rubber goods if he will consciously make an effort to design toward the elimination of complicated and impractical features which add nothing to the intrinsic value of a part. In this connection he showed several rather simple examples which demonstrated what can be done toward reducing mold and manufacturing costs, indicating actual savings which accrued when "ginger bread" was eliminated from the original design. Among examples shown and discussed were rubber rings, body shims, brake lever pads, and motor mountings.

To aid engineers who are not conversant with mechanical rubber goods manufacturing techniques and their limitations, Mr. Mason presented a list of 14 questions to aid them in their design work. These included such questions as: Are dimensional tolerances as liberal as is practical? Are the metal inserts essential? Are insert dimensional tolerances realistic? Is the part designed so that a two-plate mold can be used? Can radii at the mold parting line be eliminated? Will the type of finish allow dry ice or abrasive tumbling? In concluding, he pointed out that all mechanical goods manufacturers will gladly cooperate with engineers in their design problems.

The final paper in the symposium, presented by Mr. Armstrong, dealt with the considerations that must be taken by the molded goods product engineer in quoting, setting up and producing new parts. He outlined a number of suggested product changes, types of molds, equipment and production methods which must be considered. The discussion period was mainly concerned with the question of tolerances and with the cost factors involved in compression, injection and transfer molding. In the latter instance, it was agreed that the type of molding utilized was dictated by the specific product.

A fourth paper given at the rubber session was on the "Mechanical Properties of High Mooney Elastomers," prepared by Merle J. Sanger and Paul J. Earley, of the General Tire & Rubber Co., Akron, Ohio, and delivered by Mr. Earley. The paper covered the effect of higher Mooney viscosities on the mechanical properties of the compound and the effect of different types of softeners or extenders.

Mr. Earley pointed out that the high Mooney elastomers currently account for almost 30% of total GR-S output, and indicated that one of the reasons for their rapid growth was the savings in cost possible. Through charts and graphs he indicated that although the properties of these elastomers varied somewhat, dependent on the amounts of oil added, no loss in mechanical properties was involved when larger quantities of oil were added. (EDITOR'S NOTE: This paper will be published in an early issue of RUBBER AGE.)

Papers at Plastics Sessions

Among the six papers presented at the two plastics sessions was one on the "Properties and Uses of Polytetrafluoroethylene" by L. W. Cornell, Tape Pilot Plant, Minnesota Mining & Mfg. Co., St. Paul, Minn., in which the numerous applications of polytetrafluoroethylene (Teflon) were outlined. These include its use in electrical insulation for high and low temperatures, for chemical protection in valves, gaskets and diaphragms, and as a coating material where its anti-stick property is required.

Another paper was on "Unplasticized Polyvinyl Chloride—A Corrosion-Resistant Structural Material." Presented by George S. Laaff, Bolta Co., Lawrence, Mass., this paper illustrated the important position which unplasticized polyvinyl chloride occupies in today's engineering construction. Useful information was furnished with regard to the testing, welding, forming and various types of molding techniques as well as data on construction and machinery details to prevent pitfalls in basic applications and engineering.

Some of the advantages and disadvantages of the relatively new weigh feeding method for injection molding were covered in a paper on "Weighed Starved Feeding" prepared by Richard W. Miler and Gordon Thayer, of the Dow Chemical Co., Midland, Mich., and presented by Mr. Miler. Among the advantages stressed were these: (1) The correct amount of material may be fed into the mold cavity; (2) Material savings are obtained; (3) More strain-free parts may be obtained; (4) Maximum machine pressure can be utilized; (5) Lower cylinder temperatures and higher mold temperatures may be used.

Other papers presented at the plastics session included "Metal-Clad Laminates Used in Printed Circuitry," by Norman A. Skow, Synthane Corp., Oaks, Penna.; "Reinforced Plastics Connector Rings and Bolts for Fastening Timbers," by H. A. Perry, Jr., Naval Ordnance Laboratory, White Oak, Silver Springs, Maryland, and "The Navy Looks at Structural Plastics," by W. R. Graner, Bureau of Ships, Navy Department, Washington, D. C.

William Hedges, Columbus Coated Fabrics Co., and Charles M. Fields, Shellmar Products Corp., served as chairman and vice-chairman, respectively, at the first plastics session, and Robert I. Leininger, Battelle Memorial Institute, as chairman at the second plastics session. R. W. King, of the Battelle Memorial Institute, acted as Reporting Representative for the Rubber and Plastics Division for the meeting.

NPA Revokes Last Rubber Curb

As this issue was going to press, the National Production Authority announced the revocation of Order M-2. This marked the end of twelve years of government controls over the rubber industry. The last of the restrictions to go was a ban on the use of pale crepe grades of natural rubber in tires, where they were used for making white sidewall tires. NPA said the military stockpile can now get all the pale crepe it needs without restraints on civilian use.

Conference Delegates Killed

Four delegates en route to the International Rubber Study Group Conference which began in Copenhagen, Denmark on May 11, were killed when a British Comet jet airliner crashed on May 2, minutes after a take-off from Calcutta. They were identified as F. J. Kemlo, chairman of Harrisons and Crosfield, Ltd.; J. T. Cartwright, an official of the same firm; Nasaruddin Bin Abdul Rais, member of the Perak State Council in Malaya; and Mohamed Aris, Malayan rubber planter.

NEW YORK GROUP HEARS TALKS ON NEW RIGID STRUCTURAL PLASTICS

Approximately 250 members and guests of the New York Rubber Group attended the Spring Meeting held on April 10 at the Henry Hudson Hotel in New York, N. Y. The program for the meeting consisted of the presentation of three technical papers on the theme "New Rigid Structural Plastics." Speakers, all from the Naugatuck Chemical Division of the U. S. Rubber Co., included: Dr. D. L. Schoene, assistant director of research and development; Dr. P. M. Elliott, assistant manager of the Plastics Division; and A. A. Stover, manager of vinyl development.

In his paper on "Rigid Structural Plastics—Rubber-Resin Blends," Dr. Schoene presented data showing that thermoplastics obtained from rubber-resin blends have high impact strength combined with good hardness and rigidity. He pointed out that by using a styrene-acrylonitrile resin modified with a butadiene-acrylonitrile rubber it was found that a marked increase in toughness was obtained with very little sacrifice in hardness and heat distortion of the resin.

Through the use of the nitrile rubber, he said, it was possible to avoid the "cheesiness" or low flexural strength which sometimes accompanies the addition of an elastomer to a resin. By careful control of the composition of both resin and rubber, and by mixing in proper proportions, it was possible to obtain satisfactory hardness and rigidity of the blend with a twenty-fold increase in toughness over the unmodified resin. Monomer ratios, the speaker observed, can vary in both rubber and resin while combining proportions in the blends can be altered over definite ranges. This has made it possible to tailor a blend to meet any requirement.

As a result of this work, a series of molding and extrusion compounds, known as "Kralastics", has become available. They are characterized by markedly increased impact strength and are finding use in applications where toughness is a requisite. One disadvantage of the system is the fact that the blends are opaque and cannot be used where transparency is required. Nevertheless, a full range of colors can be obtained which permits general use of these materials.

Dr. Schoene stated that both suppliers and molders are evidencing growing interest in such combinations, which promises that future developments in rigid thermoplastics will include much wider use of rubber-resin blends.

Dr. Elliot's paper on "Polyester Resins" indicated briefly some of the potentialities of the Vibrin polyester resins. Through the use of an interesting series of slides, Dr. Elliott showed the synthesis, types of Vibrins, mechanical and electrical properties of the materials and production methods.

The speaker stated that among the various production methods in the polyester field, probably the most important is what is known as "matched die molding." The basic operations of this process were depicted on slides and discussed by the speaker. Dr. Elliott also discussed continuous laminating and the preparation of tailored laminates. To illustrate this latter process, he showed a few slides depicting the production of the Glaspar-Vibrin car body.

Potting, or embedment, as another process using polyesters was outlined by Dr. Elliott. Other types of processes used in producing polyester products, he said, include such special operations as the production of solid rod for fishing rods; the production of wound laminated tubing for pipe; "gunk" molding, and straight compression or transfer molding of mineral filled mixtures. Dr. Elliott exhibited several products made by each of the various processes discussed.

"New Developments in the Rigid Vinyl Field" was the subject of the address by A. M. Stover. The speaker discussed the properties of the Marvinol Rigid Compounds, and outlined advantages they offer as to lightness of weight, and chemical resistance. He described some applications made in Germany during the last war and uses found for the material today.

The meeting also featured a cocktail hour and the serving of a dinner, following which there was a period of entertainment.

KOPER AND LUNKE JOIN HARWICK STANDARD TECHNICAL SALES STAFF

Arthur Koper

Arne W. Lunke

Harwick Standard Chemical Co. has announced the appointment of two new technical sales representatives. Arthur Koper, who has just returned from a two year recall service with the U. S. Navy, has joined the Akron office, while Arne W. Lunke, formerly associated with the U. S. Gypsum Co., has joined the Chicago office. Prior to Mr. Koper's active service, he was associated with the B. F. Goodrich Co., having joined their organization as chemist in the general laboratories in 1939. Later, he was in the Engineering Division as water and fuel chemist and in 1946 was transferred to the Purchasing Division as a buyer of chemicals, pigments and fabrics. Mr. Koper attended Westminister College, New Wilmington, Penna., from which he was graduated in 1936 with a B. S. degree in chemistry. He received his M.S. degree from the Carnegie Institute of Technology in 1937 and in 1940 attended Akron University for a course in rubber chemistry.

Mr. Lunke is a native of Norway and was graduated from the Oslo Handelsgymnasium in 1937 with a degree in business administration. Later, he attended the University of Leeds in England, graduating with a degree in chemical engineering in 1946. Until 1950, Mr. Lunke was connected with the tanning industry both in Norway and in the United States in sales and executive capacities. His experience in leather and industrial chemicals extends into production as well as sales. Both are members of the American Chemical Society.

Witcarb RC Calcium Carbonate

Witco Chemical Co. has announced the addition of "Witcarb RC" to its line of Witcarbs. A new, coated, ultrafine calcium carbonate, Witcarb RC is now available in commercial quantities for the rubber industry. Witcarb RC is characterized by easy dispersion without special handling. Its use results in lowered costs and improved quality where dispersion problems occur, and also eliminates masterbatching. Witcarb RC's coating does not retard cure and it has essentially the same properties as the uncoated ultrafine Witcarb, the company states.

Maintains Shipment Schedules

Officials of the American Polymer Corp., Peabody, Mass., whose plant was damaged by an explosion on April 30, have announced that the plant will be back in production in a very short time. In the meantime, customers will be served by other plants located at Leominster, Mass., Illiopolis, Ill., and Toronto, Ont., Canada. All shipments to American Polymer customers will go forward without delay. One man was fatally injured in the blast.

QUEBEC-SPI-SPE JOINT MEETING HEARS PARKS ON RIGID PLASTICS

On April 16, the Quebec Rubber and Plastics Group, the Society of the Plastics Industry and the Society of Plastics Engineers held a joint meeting at the Queen's Hotel in Montreal, Que., Canada. About 60 members and their guests attended the meeting which was addressed by C. E. Parks of the B. F. Goodrich Chemical Co. Mr. Parks spoke on "Rigid Polyvinyl Chloride Plastics."

The speaker stated that during the last twenty years, since methods for softening and processing polyvinyl chloride were first discovered, most of the research and development work has been directed toward improving and finding new applications for the soft vinyl plastics. This research has been well rewarded by greatly improved products and vastly expanded markets.

The excellent chemical properties of the rigid vinyls make them particularly desirable for those applications which present severe corrosion problems, Mr. Parks stated. They offer excellent service when exposed to strong acids and alkali and are often the most practical economically where very mild chemicals such as weak acids, bases, salts, water and atmospheric gases cause corrosion problems.

The general purpose applications for rigid vinyls will probably consume much larger volumes of plastic than the super corrosive chemical service. The physical properties of rigid vinyls, he declared, make them outstanding thermoplastic materials. The general use of sheets and pipes and the construction of homes, factories, and equipment can be recommended on the basis of their beauty, permanence and low maintenance cost.

Mr. Parks then discussed processing techniques for the high molecular weight polyvinyl chloride resins, covering such topics as temperature control, equipment, mill mixing, Banbury and mill operations, milling after the Banbury, granulating and cubing, extruding, calendering, molding, laminating and fabrication.

The speaker estimated that the total consumption of rigid vinyls in 1952 was between 10-15,000,000 pounds. Most of this was used as calendered film or laminated sheet with the remainder going into pipe and tubes. The potential volume for rigid vinyl plastics is estimated by most authorities to be in the neighborhood of 100,000,000 pounds per year, he declared.

Detroit Holds Spring Meeting

The Spring Meeting of the Detroit Rubber and Plastics Group was held on April 17 at the Detroit Leland Hotel in Detroit, Mich. Principal speaker of the evening was Dr. S. L. Bass, assistant general manager of the Dow Corning Corp., Midland, Mich., who spoke on "A Post-War Look at the Free Industrial Countries —West Europe and Japan." The speaker presented an up-to-date picture of conditions throughout the areas under discussion. He also discussed the various products available to the people of these countries. Dr. Bass illustrated his talk with slides which depicted the progress of the rehabilitation program.

Coming Events in the Rubber Industry

May 19. Elastomer and Plastics Group, Northeastern Section, A.C.S., Massachusetts Institute of Technology, Cambridge, Mass.

May 22. Chicago Rubber Group, Morrison Hotel, Chicago, Ill.

May 27-29. Rubber Division, A.C.S., Spring Meeting, Hotel Statler, Boston, Mass.

June 2. Los Angeles Rubber Group, Hotel Statler, Los Angeles, Calif.

June 4. No. California Rubber Group, Elk's Club, Berkeley, Calif.

June 5. Division of Rubber Chemistry, C.I.C., Windsor, Ont., Canada.

June 6-7. Los Angeles Rubber Group, Summer Outing, Miramar Hotel, Santa Barbara, Calif.

June 6. So. Ohio Rubber Group, Summer Outing, Inland Recreation Center, Dayton, Ohio.

June 9-11. International Aviation Trade Show, Hotel Statler, New York, N. Y.

June 11. New York Rubber Group, Summer Outing, Sundance Lodge, Caldwell, N. J.

June 12. Ft. Wayne Rubber and Plastics Group, Golf Outing, Tippecanoe Country Club, Lake Tippecanoe, Ind.

June 16. Buffalo Rubber Group, Summer Outing.

June 19. Akron Rubber Group, Summer Outing, Firestone Country Club, Akron, Ohio.

June 19. Boston Rubber Group, Summer Outing.

June 19. Quebec Rubber and Plastics Group, Golf Tournament, Granby, Que., Canada.

June 23. Los Angeles Rubber Group, Hotel Statler, Los Angeles, Calif.

June 26. Detroit Rubber and Plastics Group, Summer Outing, Hillcrest Golf Club, Detroit, Mich.

June 29-July 3. A.S.T.M., Annual Meeting, Chalfonte-Haddon Hall, Atlantic City, N. J.

July 24. Chicago Rubber Group, Summer Outing.

Aug. 4. New York Rubber Group, Golf Tournament.

Aug. 21. Philadelphia Rubber Group, Poor Richard Club, Philadelphia, Penna.

Sept. 9-11. Rubber Division, A.C.S., Fall Meeting, Hotel Sherman, Chicago, Ill.

Sept. 17. So. Ohio Rubber Group, Engineers' Club, Dayton, Ohio.

Sept. 19. No. California Rubber Group, Summer Outing, Adobe Creek Lodge, Los Altos, Calif.

Oct. 2. Detroit Rubber and Plastics Group, Fall Meeting, Detroit-Leland Hotel, Detroit, Mich.

Oct. 6. Buffalo Rubber Group, Hotel Westbrook, Buffalo, N. Y.

Oct. 6. Los Angeles Rubber Group, Hotel Statler, Los Angeles, Calif.

Oct. 16. Boston Rubber Group, Fall Meeting, Hotel Somerset, Boston, Mass.

Oct. 16. New York Rubber Group, Fall Meeting, Henry Hudson Hotel, New York, N. Y.

Oct. 23. Akron Rubber Group, Mayflower Hotel, Akron, Ohio.

Nov. 10. Los Angeles Rubber Group, Hotel Statler, Los Angeles, Calif.

Nov. 13. Philadelphia Rubber Group, Poor Richard Club, Philadelphia, Penna.

Dec. 11. Boston Rubber Group, Xmas Party, Hotel Somerset, Boston, Mass

Dec. 11. Detroit Rubber and Plastics Group, Xmas Party, Sheraton-Cadillac Hotel, Detroit, Mich.

Dec. 11. New York Rubber Group, Xmas Party, Henry Hudson Hotel, New York, N. Y.

Dec. 12. So. Ohio Rubber Group, Xmas Party, Miami Valley Country Club, Dayton, Ohio.

Dec. 15. Buffalo Rubber Group, Xmas Party.

Jan. 24, 1954. Philadelphia Rubber Group, Poor Richard Club, Philadelphia, Penna.

Apr. 14-16, 1954. Rubber Division, A.C.S., Spring Meeting, Hotel Brown, Louisville, Ky.

Sept. 15-17, 1954. Rubber Division, A.C.S., Fall Meeting, Hotel Commodore, New York, N. Y.

NO. CALIFORNIA HEARS MORRILL DELIVER PAPER ON EPON RESINS

A summary of the paper on "Epon Resins in Structural Applications" given by J. L. Morrill of the Chemical Products Department, Shell Chemical Corp., before the February 12th meeting of the Northern California Rubber Group at the Elk's Club in Berkeley, Calif., has recently become available. The summary of Mr. Morrill's paper appears below:

The "Epon" resins are a new class of plastics materials characterized by reactive epoxy groups and hydroxyl groups. They are manufactured from epichlorohydrin and bis-phenol A. By esterifying the Epon resins with drying oils or their acids, products are formed which are useful for clear or pigmented surface coating materials with exceptional adhesion, flexibility and chemical resistance. They may be cured by air-oxidation or by baking, depending upon the acids or oils used.

While the surface coating field is the principal one for the Epon resins at the present time, these resins also show great promise as structural materials in the fields of laminating, adhesives, potting and casting materials, and as foams. In the form of Fiberglas laminates, the Epon resins provide physical properties considerably better than the polyesters currently in wide use, and may be used in either wet- or dry-lay up methods.

In the adhesives field, these resins offer great promise for bonding metal and other materials. Shear strengths as high as 6400 psi are obtained with aluminum. These adhesives contain no volatiles, cure at low or moderate temperatures, and require no pressure. The low shrinkage of the Epon resins upon cure and their excellent electrical properties make them of great value for potting electrical components and for the embedment of electronic circuits. These features are valuable in many civilian and military applications, such as communications equipment and radar.

When foamed, the Epon resins offer a combination of light weight and strength. In this form, they are useful as a structural reinforcement which may be foamed in place, or as a light weight potting material for electrical equipment, where a good moisture barrier is desired. It is felt that the Epon resins have many useful properties which will result in their wide use in these fields of structural plastics, the author concluded.

Schwartz "VC-2" Vinyl Cement

Inflatable vinyl toys can be patched with a new vinyl cement developed for toy industry use according to the Schwartz Chemical Co., New York, N. Y. The company reports that several toy manufacturers who have tested the adhesive are beginning to provide patch kits containing a small amount of the vinyl cement with every inflatable toy. "VC-2", as it is called, is also recommended for cementing patches to vinyl covers, tarpaulins, and children's wading pools. In addition, the adhesive can be used to cement flexible vinyl doll heads to cloth bodies. Another recommended application is for cementing hair on vinyl doll heads.

Promotions at Federal Fawick

John V. Eakin

Federal Fawick Corp., Cleveland, Ohio, has announced the appointment of John V. Eakin as general manager of the Fawick Airflex Division, and Theodore E. Metz as advertising manager of the corporation. Mr. Eakin has been with the company since 1943 and was formerly assistant general manager, sales manager, and southwestern district manager. In his new position, he will be responsible for the direction of the Fawick Airflex Division. Before joining Fawick, Mr. Eakin was employed for three years in the Engineering Department of the National Supply Co., Toledo, Ohio. A native of Eldorado, Kansas, Mr. Eakin is a graduate of the University of Oklahoma, holding a Bachelor of Science degree in Mechanical Engineering. He is a member of the Kappa Sigma social fraternity and also a member of the Cleveland Athletic Club. Mr. Metz was the advertising manager of the Fawick Airflex Division and of the Fawick Airflex Corp. prior to the merger of Fawick and Federal Motor Truck Co., Detroit, Mich. He has been with Fawick since 1948, having previously been a member of the Sales Department. In his new position Mr. Metz will be responsible for the administration of advertising and sales promotion for the corporation.

Connecticut Elects Officers

The Connecticut Rubber Group has announced the election of the following members as officers for the 1953 season: *Chairman*, Francis J. Rooney (G-E); *Vice-Chairman*, Guy A. DiNorscia (Sponge Rubber Products); *Secretary*, James R. Boyle (Armstrong Rubber); *Treasurer*, Ward E. Fisher (Armstrong Rubber). The following members were named as directors and members of the Executive Committee: A. Panagrossi (Connecticut Hard Rubber); A. J. Schorr (R. T. Vanderbilt); T. H. Fitzgerald (Naugatuck Chemical); C. R. Haynes (Binney & Smith); and C. R. Sprague (Sponge Rubber Products).

A price reduction of three cents per pound for most polyethylene resins and compounds, effective April 15, 1953, has been announced by the Bakelite Co.

HOWLAND AND KLEINFELD ADDRESS APRIL 15TH WASHINGTON MEETING

The April 15th meeting of the Washington Rubber Group held in the auditorium of the Potomac Electric Power Co. Building in Washington, D. C., heard two interesting speakers from the U. S. Rubber Co. The first speaker, Dr. Louis H. Howland, manager of synthetic rubber research and development, spoke on "Some Recent Developments in Polymerization of GR-S at Low Temperatures." The second paper of the evening was given by M. J. Kleinfeld, head of vinyl compound development for the Naugatuck Chemical Division.

Dr. Howland discussed polymerization formulae for polymerization at 41° F. to give quality and maximum flexibility. He noted that the first efforts in polymerization at 41° F. required about 14 hours to reach 60% conversion. It was found that the addition of 0.003 parts of diethylene triamine per 100 parts of charge reduced the polymerization time from 14 to 8 hours. The use of K_2SO_3 in small quantities also reduced the polymerization time, he said.

Since many properties of GR-S were improved by low-temperature polymerization, it was only logical to look to sub-freezing polymerization for further improvement, he observed. The use of methanol in the process affects the character of the polymer, he noted. The fatty acid has more effect than the rosin soaps at sub-freezing temperatures.

The continuous process which uses 750 feet of ¾-inch pipe is as yet only in the pilot plant stage but those developing this process have great hopes for the future since it would speed up production and greatly reduce the cost of installations.

In his talk, Mr. Kleinfeld discussed the several methods of obtaining polyvinyl chloride foams such as whipping air into the fluid plastic, the use of gaseous reactions, the treating of plastic with inert gases under pressure and chemical blowing agents. The latter process is most generally used today, he observed. The use of such blowing agents as Celogen and Unicel ND was described in some detail. The speaker exhibited several end-items now on the market which utilize both flexible and rigid plastic foam.

Planning New Foam Plant

U. S. Rubber Co. has announced that it is planning to build a large, new foam rubber manufacturing plant in Santa Ana, Calif., to meet the increasing demands for foam rubber products on the west coast. The company expects to break ground for the new foam plant in June, on 54 acres of land which it owns in the southern part of the city. According to present plans, manufacturing will start late this year. The plant will be devoted exclusively to the manufacture of U. S. Koylon foam rubber products and will greatly speed up service to the growing west coast market. The Santa Ana, Calif. plant will be the company's third manufacturing unit for foam rubber products and its sixth major expansion for the manufacture of Koylon foam since World War II. Other installations are in Mishawaka, Ind., and in Woonsocket, R. I.

FORT WAYNE ELECTS OFFICERS; HEARS PALMER DELIVER ADDRESS

Approximately 115 members and guests of the Fort Wayne Rubber and Plastics Group attended the April 2nd meeting held at the Hotel Van Orman in Fort Wayne, Ind. The meeting featured an announcement of the results of the letter-ballot for officers for the 1953-54 season, and an address by Dr. Henry F. Palmer, vice-president of the Kentucky Synthetic Rubber Corp. Dr. Palmer spoke on "The Synthetic Rubber Situation."

Officers elected for 1953-54 include the following: *Chairman*, Charles Cougill (Auburn Rubber); *Vice-Chairman*, Howard Rapp (Belden Mfg.); *Secretary-Treasurer*, J. L. Carlson (Paranite Wire & Cable). The following members were elected to the Executive Committee: A. R. Brandt (Schacht Rubber); C. N. Everingham (Goshen Rubber); P. Lantz (Syracuse Rubber); W. Wilson (R. T. Vanderbilt); M. O'Connor (O'Connor & Choate); J. Dunne (C. P. Hall); and D. F. Reahard, Jr. (General Tire).

In his address, Dr. Palmer discussed the government's synthetic rubber program since before Pearl Harbor up to the present. He also discussed the recent RFC report "Program for Disposal to Private Industry of Government-Owned Rubber-Producing Facilities."

World Requirements Rising

It was pointed out that there is every likelihood that over the next ten to twenty years world requirements for new rubber will so greatly exceed the supply of both natural and synthetic rubber that it will be necessary to construct a considerable amount of new synthetic rubber producing capacity.

Under present monetary conditions, Dr. Palmer said, synthetic rubber can probably be sold at no less than 25c a pound, but if it is extended with oil it may be from 3 to 7c a pound cheaper. While it is not possible to predict what the future price of natural rubber will be, there is every reason to expect that quality-wise and price-wise, synthetic and natural will be reasonably competitive and each assured of its place in the economic system.

Dr. Palmer noted that the recently publicized system of polymerization in pipelines must be developed more before it can be commercial. It does, however, have definite possibilities, he said.

Speaking of research and development, Dr. Palmer observed that private industry has a good record and should be allowed to take over these functions fully within a year after disposal.

Government thinking, he pointed out, appears to be directed toward a higher return on the original dollar than during disposal of some synthetic rubber facilites in the years after World War II. It is hoped that there will be reasonableness by both government and private industry in negotiating a price so as to effect disposal of government-owned plants to private industry within the near future. A particularly good opportunity is available for industry to collectively purchase the government laboratories in Akron as a nucleus for the often mentioned rubber institute, he concluded.

James Retires From NPA

Herbert M. James

Herbert Miner James, chief of the Consumption and Inventories Branch of the Rubber Division, National Production Authority, has retired after 22 years of government service. Mr. James was born on February 13, 1886 in Amboy, Ill. He was graduated from the School of Commerce of New York University in 1910. After many years' service as a public accountant, he moved to Bristol, Penna., as auditor for the Merchants Shipbuilding Corp. Later, he joined the U. S. Rubber Co., where he served as assistant to the executive vice-president until 1929. Subsequently, Mr. James served ten years with the Securities and Exchange Commission and from 1942 until his retirement as chief rubber statistician for OPM, OEM, WPB, CPA, Department of Commerce and the Rubber Division of NPA. On April 23, Mr. James was feted at a "surprise" party in Washington, D. C., at which no less than five former directors of the succession of rubber bureaus appeared. Present were Walter Krappe, director of the Rubber Division, NPA, E. D. Kelly, director of the Office of Synthetic Rubber, RFC, L. E. Spencer, assistant to the president of the Goodyear Tire & Rubber Co., Earl Glen, former head of the Rubber Division, NPA, and W. J. Sears, president of the Rubber Manufacturers Association. Letters from two earlier directors, James Clark and L. D. Tompkins, were made part of a leather-bound, gold-imprinted testimonial document to Mr. James, "one of the few men who has always shared the complete confidence and trust of the rubber industry."

No. California Hears Dew

The April 9th meeting of the Northern California Rubber Group held at the Elk's Club in Berkeley, Calif., featured an address by Dr. Walter A. Dew of E. I. du Pont de Nemours & Co., Inc. Dr. Dew spoke on "A Look at DuPont Research." He stated that DuPont is presently working on a budget of $1,000,000 per week for research and development. Dr. Dew called attention to the fact that today one-half of the products that DuPont is manufacturing was not in production in 1930. He spoke on chlorinated hydrocarbons, rubber-base paints, Teflon, neoprene, Hypalon, Orlon and nylon. Dr. Dew also spoke of the DuPont fellowships in colleges and universities which now have reached a total of $600,000.

ELASTOMER AND PLASTICS GROUP HOLDS INTERESTING APRIL MEETING

The Elastomer and Plastics Group of the Northeastern Section, American Chemical Society, sponsored an interesting afternoon symposium on "Rubber Plasticized Resins" at the April 9th meeting of the Northeastern Section at the Massachusetts Institute of Technology in Cambridge, Mass. H. A. Hill (National Polychemicals) acted as chairman of the symposium. Principal speakers were A. P. Landall (G-E), who spoke on "Rubberized Phenolics," and J. F. Malone (Goodrich Chemical), who spoke on "Rubber Plasticized Vinyls."

Mr. Landall discussed the background of the development work leading to the development of rubber-phenolic materials as made by General Electric today, and discussed their standard physical characteristics as well as non-standard tests which have been developed. He also discussed mold design data including types of molds for various applications with special attention to shrinkage, dimensional tolerances, warpage and surface finishes.

With the aid of slides, the speaker discussed the various points brought out in his talk. Shown were actual applications with the design data which made them successful.

Mr. Malone's talk was concerned with nitrile-type rubber plasticizers for polyvinyl chloride. Mr. Malone outlined the effects of various concentrations of this plasticizer upon the physical and chemical properties of the end product.

Processing Methods Discussed

His talk also included a short discussion on processing methods and characteristics of rubber plasticized PVC. Compounding techniques and procedures were also discussed. In addition, the various applications and uses of rubber plasticized vinyls were pointed out. His talk was supplemented by slides and examples of industrial applications.

An evening symposium sponsored by the Northeastern Section brought together Warren S. Lockwood (Natural Rubber Bureau) and S. M. Cadwell (U. S. Rubber) on a discussion of "Synthetic vs. Natural Rubber—1960." Mr. Lockwood spoke on the "Future of Natural Rubber," while Dr. Cadwell spoke on the "Future of Synthetic Rubber."

Mr. Lockwood spoke of the problems facing natural rubber including the political and economic aspects of the situation. He also outlined current improvements and new uses which are being developed for the material. Dr. Cadwell spoke of the technical problems inherent in synthetic rubber. His talk included a summary of the chemistry of polymerization techniques and the physical properties of synthetic rubbers. He also dwelt on the "know how" gained from research in synthetic rubber and how this knowledge will influence future investigation and development.

Adhesive Products Corp., New York, N. Y., has developed a new adhesive, "Felt-Grip," for applying felt to wood, metal, plastics and other surfaces.

Named Plastics Sales Manager

Harold M. Parsekian

Harold M. Parsekian, formerly sales manager for Marvinol vinyl resins, has been appointed sales manager for all plastics manufactured by the Naugatuck Chemical Division of the U. S. Rubber Co. In his new capacity, Mr. Parsekian will supervise sales for Marvinol vinyl resins, Kralastic styrene copolymer molding and extrusion powders, Vibrin polyester resins, and other plastic raw materials manufactured by the division. A graduate of Cooper Union with a bachelor's degree in chemical engineering, Mr. Parsekian joined Naugatuck Chemical in 1950 when U. S. Rubber purchased the assets of the Chemical Division of the Glenn L. Martin Co. He had been director of sales and technical service for the Chemical Division of the Martin company. Mr. Parsekian is a member of the American Chemical Society, Commercial Chemical Development Association, Society of the Plastics Industry and the Society of Plastics Engineers.

Seiberling To Make Atlas Tires

Seiberling Rubber Co. has announced that it is completing negotiations to manufacture tires for the Standard Oil Co. of Ohio under the "Atlas" brand name. The announcement said that the company would produce Atlas brand tires for sale by Sohio's retail outlets, in line with the oil company's policy of obtaining its merchandise, when possible, in Ohio. This is the first time in the tire company's history that it has undertaken to produce tires other than those bearing the Seiberling name. Amount of the pending contract was not revealed. A Seiberling spokesman said the Sohio contract will enable his company to put to fullest advantage recently expanded production facilities, and at the same time would tend to stabilize the production picture throughout the year.

DuPont Drops "S-2" from Hypalon

The Polychemicals Department of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., has dropped the code number "S-2" from its designation for its chlorosulfonated polyethylene, "Hypalon". "Hypalon" now stands alone as the trade mark for this material.

Goodrich Sales Up 23%

Sales of the B. F. Goodrich Co. for the first quarter of 1953 increased to $171,175,551, or approximately 23% more than in the first quarter of 1952, John L. Collyer, chairman of the board and president, announced to stockholders at the annual meeting recently. With the substantial increase in sales, the first quarter earnings will be somewhat higher than for the first quarter of last year, he said. Capital expenditures of the company for the year 1953 were estimated by Mr. Collyer to be materially above the $21,900,000 invested in 1952. He stated that funds to finance such capital investment are being obtained from depreciation reserves and from earnings retained in the business. Mr. Collyer indicated that 1953 consumption of new rubber in the United States is expected to reach 1,330,000 long tons, as compared with 1,261,000 long tons in 1952. Though the 1953 anticipated consumption is more than double that of the highest pre-war peacetime year—1940 when consumption was 651,000 long tons—Mr. Collyer stated that he expected to see a consumption level approximating 1,600,000 long tons for some year around 1960.

Guayule Activities Limited

The guayule project sponsored by the Department of Agriculture will be considerably limited in the forthcoming fiscal government year. Of two main lines of research—plant breeding and genetics and product recovery and processing—only breeding research will continue, the budget request for recovery and processing work having been turned down. The guayule project was launched in 1942 as an emergency measure but major effort was halted in 1945. The project, however, was kept alive by a research contract with Stanford Research Institute. Although guayule workers have developed a recovery process which gives a satisfactory rubber, no full-scale production method has yet been developed which could make guayule rubber competitive with natural rubber.

Consulting Services 14th Edition

The Association of Consulting Chemists and Chemical Engineers, Inc., 50 East 41st St., New York 17, N. Y., has announced the availability of the Silver Anniversary Edition of "Consulting Services" for 1953. This is the 14th edition and totals 144 pages. The book is divided into sections listing the members, outlining the scope of their activities and their equipment and an index. One copy of the book is free, with additional copies at $1.00 each. Requests should be addressed to the Association giving complete name and address and source of reference.

"Clickety-Clack" Cure Developed

Dayton Rubber Co. has announced development of a rubber-cushioned railroad tie plate it says will cut down "clickety-clack" roadbed noises. The rubber insert is being tested in Kentucky. Made of a combination of synthetic and natural compounds, the rubber inserts cushion the shock load between rail and tie, increasing the life of both, the firm said.

Galloway Elected Vice-President

F. M. Galloway

F. M. Galloway has been elected vice-president in charge of research and development for the Quaker Rubber Corp., a division of the H. K. Porter Co., Inc., Philadelphia, Penn. Mr. Galloway joined Quaker Rubber in 1933 as assistant chemist and has been successively chief chemist and technical superintendent until his present promotion. He has been a member of the board of directors of Quaker Rubber since 1947. Before coming to Quaker Mr. Galloway was with Master Tire and Rubber Co. A graduate of the University of Akron with a B.S. in rubber chemistry, Mr. Galloway is a member of the American Society for Testing Materials, the American Chemical Society, and the Division of Rubber Chemistry, as well as the Technical Committee of the Rubber Manufacturers Association.

Harwick Adds New Products

Harwick Standard Chemical Co. has announced the addition of three new materials to its line of chemicals, monoethanolamine, diethanolamine, and triethanolamine. Monoethanolamine finds use as an intermediate in the manufacture of rubber chemicals as does diethanolamine and triethanolamine. The company has also announced the development of a new mold release emulsion containing 35% silicone mold release oil. Called "HSC No. 35 Silicone Emulsion," the product has been designed specifically for use as a mold spray in the molding of tires, mechanical goods, rubber and vinyl floor tiling, rubber soles and heels, and in general plastics molding. It is a white material and its fluidity is comparable to that of water. The company states that because of the product's stability to heat and mechanical agitation, this emulsion is outstanding when used as the active lubricant in bag dip.

Galleher Plans New Plant

Galleher, Inc., Cleveland, Ohio, has announced plans for the construction of a new plant at Buckingham, Fla., for the manufacture of rubber devices for the administration of anesthetics. The new plant will employ some 60 people. Most of the employees will be hired locally and sent to the home plant for training.

CIC DIVISION OF RUBBER CHEMISTRY ANNOUNCES PROGRAM FOR JUNE MEETING

The Division of Rubber Chemistry of the Chemical Institute of Canada has announced the program which has been scheduled for the meeting to be held on June 5 at Windsor, Ont., Canada. The program will begin at 9:30 A.M. and 30 minutes will be allowed for each paper. Four papers will be presented in the morning and four in the afternoon, starting at 2:00 P.M. The annual business meeting will be held from 11:30 A.M. to 12 noon, including the election of officers for the next year. T. L. Davies (Polymer Corp.), chairman of the division, will be in the chair for the entire session.

At 7:00 P.M., there will be a banquet at which an address will be given by Dr. S. M. Cadwell, director of research and development for the U. S. Rubber Co. On June 6, Polymer Corp. and the Cabot Carbon Co. of Canada, Ltd., will sponsor, for Rubber Division registrants only, a bus trip from Windsor to Sarnia for the purpose of touring the Polymer and Cabot plants. The group will be returned to Windsor in time for the president's reception and banquet that evening.

Abstracts of six of the eight papers to be presented at the meeting have been made available and are presented herewith. The other two papers to be presented at the meeting include one on rubber cements (exact title not available) by F. H. Jankowski, manager of the Adhesives and Coatings Division of the Minnesota Mining & Manufacturing Co. of Canada, Ltd., London, Ont., and one on polyester-diisocynate Vullcollan-type polymers (exact title not available) by Dr. N. V. Seeger of the Research Department of the Goodyear Tire & Rubber Co., Akron, Ohio. Abstracts of the other papers, follow:

Impact of Man-Made Fibres on the Rubber Industry. *J. W. Illingsworth (Dunlop Tire & Rubber Goods Co., Birmingham, England).* Man-made fibres have now almost completely replaced the natural fiber cotton in tire-casings and are making inroads into the belting and other sections of the rubber industry. High tenacity viscose rayon is, at the moment, by far the most important fiber, but the synthetic fibers, nylon and Terylene, with their very high tenacities are likely to become increasingly important.

The introduction of these synthetic fibers was not accomplished without encountering certain difficulties. The growth of nylon seriously limited its applications and nylon and Terylene both show a tendency to shrink on heating, leading to serious difficulties in such processes as curing. Special machinery has had to be devised for the heat treatment of the fibers as the tensions that must be maintained are well outside the range of normal textile machinery. Poor adhesion to rubber, particularly in the case of Terylene, has been another serious problem.

A further interesting development is that of the very high tenacity rayons that are appearing in several countries. They are considerably stronger than the standard industrial rayon yarns and are likely to be of special interest in meeting the ever-increasing demands of the rubber industry. These materials may be processed in a similar manner to the standard rayons and have not, therefore, the serious disadvantages of nylon and Terylene.

Versalite—A Typical Thermoplastic Rubber-Resin Composition. *O. R. Huggenberger (Dominion Rubber Co., Ltd., Montreal, Que., Canada).* Versalite is a new material belonging to the general class of thermoplastic rubber-resin compositions. The union of these two materials has opened an entirely new range of properties hitherto unattainable with a single component rubber or plastic member. Its foremost feature is a combination of remarkable toughness and high impact strength. The material has a board-like consistency which points to its obvious utility in the ever-growing field of structural application.

While there are probably an infinite number of rubber-resin systems depending on the individual components and the ratio in which they are combined, each system gives rise to its own unique set of properties. The empirical study of such systems is far in advance of the theoretical aspects, and it is not yet possible to predict accurately the properties of a particular rubber-resin blend. The family of materials known as Versalite represents one of these systems which has been investigated thoroughly, and it will indicate what can be achieved through the judicious choice of materials.

It has, for example, a Notched Izod impact value of approximately 10 foot/pound, which is roughly a twenty-fold improvement over such materials as regular polystyrene, hard rubber (ebonite), methyl methacrylate, melamine-formaldehyde, etc. The material has a Rockwell "R" Hardness of 95-105, which places it in the category of hardboard materials. Its water absorption is low. Chemically, it has proven resistant to a wide range of materials including such acids as hydrochloric, hydrofluoric, phosphoric, nitric (10%) and sulfuric (50%. It will also withstand the corrosive action of many common alkalis. It will not resist ketones, esters, aromatic hydrocarbon and chlorinated solvents.

Processwise it lends itself to the type of equipment usually found in a rubber plant. Mixing can easily be performed on open mills or Banbury mixers, and the general mode of handling the material is closely allied to that of rubber. An overall appraisal of gum-plastic compositions must, of necessity, include the techniques of fabrication to which these materials are admirably suited. Forming methods are relatively simple and equipment costs are low. Not to be ignored is the contribution which materials of this type are making in the field of piping. The strength features, coupled with chemical resistance, will create an ever-increasing demand to supplement the more conventional metallic units of long standing.

Waiting for your copy of the 1953-54 RUBBER RED BOOK? Complete and return all questionnaires quickly!

Properties and Performance of Super-Abrasion Furnace Blacks. *Fred H. Amon and H. J. Collyer (Godfrey L. Cabot, Inc., Boston, Mass.).* Super-abrasion furnace (SAF) blacks are the latest products of carbon black technology. This type of oil black, as the name implies, imparts to rubber compounds extremely high resistance to abrasive wear. The furnace process, using liquid fuels, has now provided a wide range of products, from the semi-reinforcing category through the fine particle size super-abrasion types. Widespread manufacture and use throughout the world of high abrasion furnace (HAF) blacks suggest the logic of comparing HAF and SAF blacks, although channel black is still important in many applications.

The chemical and physical characteristics of SAF blacks are described. Results of electron microscope examination are presented. Rubber test data on laboratory and factory mixed stocks confirm the enhanced performance predicted by the analytical and microscopic examinations. Results of factory processing and road tests of SAF blacks in natural rubber, cold rubber and oil-extended GR-S tires are presented. In addition to consideration of road wear, analysis is made of the effect of SAF blacks with respect to cracking.

In addition to providing extreme resistance to abrasive wear, compounding with SAF black furnishes a high degree of electrical conductivity. Tensile strength is substantially higher than that obtained with HAF black. In common with HAF black, SAF black is superior to channel black in extrusion characteristics.

While the SAF black development is linked closely with the use of synthetic rubbers, substantial amounts are used in large size truck and bus tires based on natural rubber. Compounding techniques with natural rubber and with synthetic rubber are described. SAF black in latex masterbatch, in camelback and in oil- and rosin-extended GR-S are treated briefly. Although most widely used in automotive tire tread compounds the use of SAF black is indicated for other products requiring maximum resistance to wear.

Theoretical Approach to the Design of Rubber-Oil-Black Masterbatches. *S. C. Einhorn and L. A. McLeod (Polymer Corp., Ltd., Sarnia, Ont., Canada).* The classical stress-strain equation for rubber-like elasticity has been extended to apply to polymers which are optimally reinforced by carbon black and also to stocks incorporating large quantities of non-polymeric extenders. The modified equation has been used to predict the permissible extent of dilution of a high molecular weight polymer which is to have tensile strength and modulus equivalent to those of a given reference polymer (e.g. GR-S).

Above a molecular weight of 500,000, marginal increases in the amount of diluent are shown to compensate for unlimited increases in polymer molecular weight for constant tensile properties. In the range of high molecular weight, it is shown that more diluent is required to achieve ease of processability than can be tolerated for any practical levels of modulus or tensile strength.

Rubber as It Is Used in the Modern Automobile. ***J. C. Macdonald (Chrysler Corp. of Canada, Ltd., Windsor, Ont., Canada).*** This paper gives a summary of the number and type of rubber parts required in the building of the modern automobile and illustrates the increase in usage of rubber in recent years. The important general requirements of non-functional parts and the specific requirements of functional parts, both oil and non-oil resistant, is discussed.

Production problems, as related to material and assembly and their control by means of Engineering Specification and Quality Checks, are outlined. The paper concludes with a brief resume of some of the basic research and development being done, which is of particular interest to the automobile.

Blends of Rubber and Resins. ***R. C. Bascom (B. F. Goodrich Chemical Co., Cleveland, Ohio).*** Although rubber compounders have been using blends of rubbers and resins for many years to obtain special properties in rubber compounds, the expansion of the synthetic rubbers and resins during the 1940 decade resulted in several new blends, many of which have achieved commercial importance. This paper offers a review of the present status of such blends as nitrile rubbers with phenolic, P.V.C. and styrene acrylonitrile resins as well as the use of styrene-butadiene resins as reinforcing agents for general purpose rubbers.

ASTM Quality Control Meeting

On April 16 the American Society for Testing Materials sponsored a special technical session on quality control at the Engineering Societies Building in New York City. Simon Collier, director of Quality Control for the Johns-Manville Corp., showed a sound-color film outlining the basic principles of statistical quality control. This film is used in the Johns-Manville training program. A panel of experts also discussed the various aspects of quality control. In addition to Mr. Collier, the panel included: A. B. Mundel (Sonotone); Enoch B. Ferrell (Bell Telephone Laboratories), and Ellis R. Ott (Rutgers University).

Decides Against Laboratory Site

G. M. Tisdale, vice-president of the U. S. Rubber Co., has announced that the firm has decided to withdraw from negotiations leading to the acquisition of a site in Emerson, N. J. that was to be used to create a modern research center. In consideration of the objections raised by many residents of Oradell, and because U. S. Rubber does not wish to establish an activity that is not entirely acceptable to its neighbors, Mr. Tisdale notified the owner of the property, that the purchase agreement cannot be satisfied. The company has also withdrawn its request to the Borough of Emerson for rezoning.

Diamond Alkali Co. has announced that the name of its subsidiary, Kolker Chemical Works, Inc., a New Jersey corporation, has been changed to Diamond Alkali Organic Chemicals Division, Inc.

Ebers and Schoene Promoted

Dr. Earle S. Ebers

Two major organizational changes in the Naugatuck Chemical Division of the U. S. Rubber Co. were recently announced. Dr. Earle S. Ebers, formerly sales manager of Kralastic and Vibrin resins, was named director of research and development, while Dr. Lorin Schoene, formerly manager of plastics development, was named assistant director of research and development. Dr. Ebers, a native of Canada, received his bachelors degree in chemistry from Dalhousie University at Halifax and his Doctor of Philosophy degree in chemistry from Harvard University. He also studied infrared spectroscopy at Ohio State University under a Canadian Royal Society fellowship. In 1937 he joined U. S. Rubber as a research chemist in the company's general laboratories at Passaic, N. J., and for nine years was engaged in fundamental and applied research on rubber and plastics. In 1946 he became manager of plastics development for Naugatuck Chemical, and in 1949 he was appointed to the sales post he is leaving for his new assignment. Dr. Ebers is a member of the American Chemical Society and is active in the work of the Society of Plastic Engineers and the Society of the Plastics Industry.

Dr. Schoene, who obtained his Doctor of Philosophy degree in chemistry from Iowa State University, joined U. S. Rubber in 1939 as a chemist in the company's general laboratories. Shortly afterwards he was transferred to the Far East where he became a group leader in chemical development concerned with the processing of natural rubber latex. In 1942 he was appointed a research chemist for Naugatuck Chemical. In 1947, Dr. Schoene was named manager of organic research for Naugatuck Chemical, and in 1951 he was appointed manager of plastics development. He is a past chairman of the New Haven Section, American Chemical Society, and a member of the Society of the Plastics Industry and Sigma Xi.

Trade News Service Moves

Trade News Service, formerly located at 66 Beaver St., New York 4, N. Y., has moved its offices to 24 Stone St., New York 4. The telephone number remains the same, HAnover 2-2440-1.

SMITH ADDRESSES RMA MEETING ON FUTURE OF RUBBER INDUSTRY

H. Gordon Smith, executive vice-president of the U. S. Rubber Co., delivered an interesting address on "The Industry of Eternal Youth" before the April 17th meeting of the Molded and Extruded Goods Manufacturing Committee of the Heavy Mechanical Goods Division, Rubber Manufacturers Association, at White Sulphur Springs, Va.

In his address, Mr. Smith pointed out that the rubber industry is constantly growing. The rubber industry, he pointed out, has been growing at a faster rate than the average of all industry. Since 1939, sales of rubber companies have increased from $1 billion to more than $5 billion a year. In the past 50 years, Americans have increased their use of rubber from less than one pound per person a year to 18 pounds per person.

There are two main factors which have shaped the rapid growth of the rubber industry in the past and which will continue to make it grow like a youthful industry. One factor is the automobile, the other is chemistry. The use of automobiles is still increasing, he noted, and still greater expansion is expected.

Chemistry, he continued, has given us synthetic rubber, plastics and synthetic textiles. At the same time that we are moving forward in synthetic rubber, plastics and synthetic textiles, he said, we are placing continued emphasis on chemicals which will make rubber tougher, more age-resistant, longer-wearing and more versatile.

The past rate of increase in rubber, projected over the next eight years, he pointed out, gives a 1960 consumption figure of 1,600,000 tons, or about 21 pounds per person. That would be a consumption of 17% more per person than at present.

Synthetic rubber and plastics, he said, are just beginning to have their effect on the rubber industry. Growth possibilities in plastics are astounding. He pointed out that as people continue to live better, they will continue to use more and more rubber. Certainly, he observed, we have found an industry of eternal youth—an industry that never stopped growing, and never will.

F. F. Salamon Co. Formed

Felix F. "Fil" Salamon has announced the establishment of the F. F. Salamon Co., Nyack, N. Y., as a manufacturers' representative on selected chemicals. Principal areas of operation will be Southern Connecticut, Metropolitan New York, New Jersey and the Eastern Section of New York State. The company has been appointed representative by Beacon Chemical Industries, Inc., Cambridge, Mass. Mr. Salamon states that other chemicals, mainly for rubber, plastics and related industries, will be added. For more than 22 years, Mr. Salamon was associated with the Binney & Smith Co. where he was in charge of sales for the Rubber Compounding Accessories Department. In his new venture, he will be particularly interested in the development of new and improved materials and the improvement of processing operations.

FCC REQUIRES CERTIFICATION OF DIELECTRIC UNITS IN USE

According to a recent report by Ottmar W. Noeske of the Electronics Section of the Allis-Chalmers Manufacturing Co., Milwaukee, Wisc., radio frequency heating equipment is now the subject of scrutiny in the light of the recently issued Regulation No. 18 by the Federal Communications Commission. This equipment finds use in the preheating, curing, drying and molding of rubber goods. It also finds use in the reclaiming of rubber stock bonded to metal castings, shafts and rolls.

As recently amended, these rules require certification, on or before June 30, 1953, of all equipment installed or manufactured prior to July 1, 1947. This certification date is rapidly approaching and all users of uncertified equipment have little remaining time to comply with the Commission's rules. The rules as set forth govern the assigned frequencies of operation with allowable frequency tolerance and radiation. The certification requirements as set forth are clear and concise; nevertheless, users of industrial heating equipment have questions regarding the elimination of radiation and interference.

Manufacturers of electronic heating equipment are required to meet the FCC certification regulations on the new units now being supplied. Some suppliers offer assistance to their customers in obtaining certification of units built before the regulations were issued. In general, with only a few modifications and some caution, most of the earlier electronic heater installations can be readily certified. Recommendations and services are available from consulting engineers and manufacturers regarding adequate shielding of this equipment.

Electronic Heater Signals

The many, many hundreds of electronic heaters that have been installed since World War II are presently producing many signals which are picked up by Federal Communications Commission monitoring stations. These radio signals in space can interfere with communications activities, police channels, aircraft operational channels, radio and television, making it virtually impossible for the government monitoring service to keep a close check on unauthorized communication activities. Signals originating from an industrial installation are not necessarily limited to the local area in which the equipment is operating; often signals picked up on the West Coast are traced to installations operating in the Midwest area, say at Detroit or Cleveland.

After studying the problem extensively, the FCC issued a set of regulations which were enacted in 1947. The regulations also cover scientific and medical services, but for the purpose of this report that portion applying to industrial equipment is of most concern.

The Commission rules and regulations allow an industrial electronic heater to operate without a license (required by all transmitting stations), provided certain conditions are met. The operating frequency can be held with a specified frequency limit or band, which is set aside for industrial use, or the apparatus can be shielded so that the maximum radiation at any frequency does not exceed 10 microvolts per meter at a distance of one mile from the installation and measured at a height of 12 feet above ground. The Commission rules and regulations also specify that radiating signals traveling along a power line must not be stronger than 10 microvolts per meter when measured one mile from the installation and 50 feet from the power line.

The design of the equipment and the particular application rules out, in most cases, the specification of operation within a designated frequency band. This means, in the majority of cases, the equipment must be shielded to conform with the rules and regulations.

It is the responsibility of the user of the equipment to see that this equipment is certified to conform with the FCC regulations set forth. Failure to do so may result in a notice that the equipment must cease operating until it is made to conform to the FCC regulation. In writing the regulations, the Federal Communications Commission has taken into consideration the fact that many units were already operating in the field and that some time would be required to rework and certify these installations so as to bring them within the limits of radiation.

In general, electronic radiation might be broken down into three categories, as follows: (1) Radiation from within the heater cubicle; (2) Radiation from the electrodes or coils; (3) Radio frequency feedback to input power lines, causing radiation resulting from the power lines carrying these high frequency signals.

The latter, radiation from power lines, is in most cases the easiest to control, and at the present time many manufacturers are taking care of this problem with a filter network within the heater cubicle. For users of older equipment this filter can be fabricated easily by using components readily available from the radio industry.

Most up-to-date equipment is being constructed in radio frequency shielded cubicles, with proper maintenance the cubicles remain shielded indefinitely. If a manufacturer is using an early model of an induction or dielectric heater housed in a nonmetallic cabinet, he may either replace the equipment with a more recent design or build a RF-tight metallic cubicle or screened room. In cases where the metallic cubicle is used but where the radiation from the cubicle still exists, the report offers a few hints for their correction. The hints are listed as follows:

(1) If the heater contains access doors or panels which do not close properly to make a good electrical contact to the cabinet itself, the addition of copper weather stripping or copper banding strips, will help correct the difficulty.

(2) If the heater cubicle contains a window or opening which is not covered with screening, it is possible that radiation is being emited at that point. Copper mesh soldered to cover the window or opening will provide adequate shielding.

(3) In some cases the cabinets may be made in sections with inadequate bonding between the sections. To correct this condition, such panels should be removed and the contacting areas and butting surfaces should have paint, rust and other foreign matter removed. Sections should then be reassembled with precaution to assure good electrical contact.

Suppression of Radiation

Suppressing radiation from the coils or electrodes at the work station is difficult since the user is always faced with the necessity of getting work into and out of the heating zone. In some cases the size or shape of the parts makes it virtually impossible to shield the installation and still maintain good material flow. A user might well find himself faced with the task of building a shield around the heating zone, thus making it impossible for him to use his heater. In these cases a shielded room or metal cage enclosing the heater, work position, material handling equipment, and operator may well be the only solution.

Fortunately for the users as well as the manufacturers of this type of equipment, most applications can be handled so that only the heating elements need be enclosed. In this case material is handled on a batch type basis, permitting the heating zone to be enclosed during the heating cycle.

Cooperation between the manufacturer and user of electronic heating equipment will do much to simplify the certification of heating installations. If requested, most of the manufacturers will be glad to review the user's radiation problem and submit their recommendations, Mr. Noeske's report concludes.

Faultless "Velva-Tex" Gloves

Faultless Rubber Co., Ashland, Ohio, has introduced a new household rubber glove with a velvet-soft flock lining. Called "Velva-Tex," the new gloves are said to be as easy to slip on or off as dress

gloves. Another advantage is that it practically eliminates the sweaty, clammy feel experienced with ordinary household gloves, the company states. The new gloves also offer a non-slip feature, "Swirl-Grip." They are made of natural rubber latex for extra softness, pliability and elasticity.

Indoil Chemical Co., Chicago, Ill., has issued another of its technical data sheets on Indonex plasticizers. Ask for Circular 13-47, "Indonex Plasticizers in High Mooney Neoprene (Type WHV)."

NSC ANNOUNCES AWARD WINNERS OF 1952 RUBBER SECTION CONTEST

The National Safety Council, Chicago, Ill., has announced the results of its 1952 Rubber Section Safety Contest. All divisions of the industry showed an accident frequency rate of 5.08, 12% less than in the previous year. In Division I, which includes those plants in which more than 400,000 average monthly man-hours are worked, the average accident frequency rate for 1952 was 3.24, 21% less than in the previous year. In Division II, 200,001 to 400,000 average monthly man-hours, the accident frequency rate was 6.19, 5% above 1951. Division III, 100,001 to 200,000 average monthly man-hours, showed an accident frequency rate of 7.95, 3% less than in 1951. In Division IV, 50,001 to 100,000 average monthly man-hours, the accident frequency rate was 7.41, 32% less than in the preceding year. Division V, under 50,000 average monthly man-hours, showed an accident frequency rate of 12.12, 4% above 1951.

Goodyear Tire & Rubber Co. of England captured first prize in Division I with an accident frequency rate of .50 in 1952. Plant No. 2 of the Firestone Tire & Rubber Co. took second place in this division with a score of .60, while Firestone's Plant 1 with a score of .79 took third place in this division.

B. F. Goodrich Co. captured the first three places in the Division II category. The Tuscaloosa, Ala., plant with a score of .72 took first place, while the Oaks, Penna., plant with a score of .82 took second place. Third place went to the Goodrich Aeronautical Division at Akron with a score of 1.06.

Electric Hose & Rubber Co. of Wilmington, Del., with an accident frequency rate of .51 took first place in Division III. Second place went to the Humble Oil & Refining Co. of Houston, Texas, with a score of .62, while third place was captured by the Milan, Tenn., plant of the U. S. Rubber Co., with an accident frequency rate of .64.

In Division IV, the following companies all had a score of .00, or no accidents during 1952: B. F. Goodrich Chemical Co., Port Neches, Texas; B. F. Goodrich Co., Clarksville, Tenn.; U. S. Rubber Co., Naugatuck, Conn.; Firestone Tire & Rubber Co., Memphis, Tenn.; and the Kentucky Synthetic Rubber Corp., Louisville, Ky.

Division V showed 11 companies which had a perfect score in 1952. These companies are: Goodyear Tire & Rubber Co. of Canada, Ltd., Quebec City, Que., Canada; Firestone Plastics Co., Pottstown, Penna.; Firestone Tire & Rubber Co., Christchurch, New Zealand; Firestone Tire & Rubber Co., Akron Research Laboratories; Armstrong Cork Co., South Gate, Calif.; B. F. Goodrich Co., DuBois, Penna.; Flintkote Co., Whippany, N. J.; U. S. Rubber Co., Manchester, N. H.; Flintkote Co. of Canada, New Toronto, Ont., Canada; U. S. Rubber Co., Burlington, N. C.; and the Fabric Fire Hose Co., Sandy Hook, Conn.

A Certificate of Achievement was awarded to the Gates Rubber Co., Denver, Colo., for showing the greatest numerical reduction in accident frequency rate in Division I. Goodyear Tire & Rubber Co. of St. Mary's, Ohio, won a similar award for Division II, while the Goodyear plant at New Bedford, Mass., took honors in Division III. Goodyear's plant in Luxembourg took the Certificate for Division IV, and the Ideal Roller & Manufacturing Co. of Chicago, Ill., won in Division V.

Auto Accidents on Rise

More than 2,000,000 casualties, the worst accident toll in the nation's history, were recorded in 1952, according to figures released recently by the Travelers Insurance Companies. Traffic deaths in 1952 totaled 37,600, an increase of 500 over the 1951 mark. The death and injury totals are highlight statistics from "Who, Me?", nineteenth in an annual series of traffic accident data booklets published by the Travelers. The most dangerous mistake in driving last year was excessive speed. Speed killed 13,430 persons and injured nearly 600,000, according to the report. Drivers under 25 years of age were involved in almost 25% of the year's fatal accidents although they constitute only about 15% of the total of all drivers. More than 15,000 persons were killed and nearly 750,000 hurt in weekend crashes in 1952. Forty percent of the deaths and 36% of the injuries occurred on Saturdays and Sundays last year.

Seiberling "Safe Aire" Tire

Seiberling Rubber Co. has introduced its 1953 version of its "Safe Aire" tire. An all-rayon cord tire, the new Safe Aire has a thicker white sidewall than used before, protected from checking and cracking by a scuff bar placed below the heaviest flexing area of the sidewall area. Natural rubber is used in tread as well as sidewalls, because in the judgment of Seiberling Rubber experts, synthetic rubber compounds, as good as they are today, still generate too much heat for their use in a tire primarily designed for high speed safety driving. L. M. Seiberling, vice-president in charge of sales, said the new Safe Aire's exclusive "Claw Grip" tread has been given added traction and anti-skid qualities by 264 traction slots spaced at regular intervals to provide a firm hold on both wet and dry road surfaces. In addition, the new tire retains the company's patented "heat vents" which actually "breathe out" scorching heat which is a major cause of blowouts. Other characteristics of the new Safe Aire, as described by Mr. Seiberling, include a new cord adhesive which tests show gives a 20% better bond between the rayon cord and the rubber, and a new carcass compound with vastly improved tear resistant qualities at temperatures developed in high speed driving.

GENERAL TIRE PLANS EXPANSION; TO SELL MANSFIELD TIRE STOCK

Plans for expansion in the chemical, foam rubber, and rigid plastics fields were recently approved at the annual meeting of the board of directors of the General Tire & Rubber Co. in Akron, Ohio. Major steps in the over-all expansion program include the sale of the company's stock interest in the Mansfield Tire & Rubber Co., the building of a multi-million dollar chemical plant near Ashtabula, Ohio, the broadening of its foam rubber operations at Logansport, Ind., and the opening of a rigid plastics division at Marion, Ind.

Mansfield Tire has already announced that it has filed a registration statement with the Securities and Exchange Commission covering the sale of 237,600 shares held by General Tire. The move also includes the sale of 11,466 shares held by W. J. Coughlin, a General Tire distributor. Mansfield management personnel proposes to purchase 49,066 shares, and the remaining 200,000 shares will be offered to the public by a group of underwriters, headed by A. G. Becker & Co.

General Tire officials announced that the company plans to use the funds realized from the sale of its minority interest in Mansfield for further development of the company's chemical and related businesses. Certain working agreements between Mansfield and General Tire, dealing with research, tire testing, development and certain other operations, will be continued.

General Tire stated that its chemical facility at Ashtabula will include a polyvinyl chloride resin plant and pilot plant. Estimated cost of the project will be approximately $6,000,000. Ground was to have been broken very shortly at the plant site, a 50-acre tract of land in Ashtabula township northeast of Ashtabula.

The Ashtabula project will be supervised by General Tire's Central Engineering Department, with the Scientific Design Co., Inc., of New York, N. Y., in charge of design engineering of production facilities. General Tire's Chemical Division will operate the plant.

The foam rubber operation is expected to be in full production by mid-summer. Harold Harmon has been named as works manager of the new Rigid Plastics Division at Marion, Ohio. Process of re-tooling of Marion facilities has already been started. First shipments of plastics products to be manufactured have already been completed through pilot plant operations at the firm's Wabash and Logansport plants.

Directors, at the annual meeting, re-elected all officers of the company. Stockholders of the company had previously re-appointed all directors and, in addition, named F. W. Knowlton to the board. Mr. Knowlton has been secretary and general counsel of the company since 1951.

National Rubber Increases Stock

Stockholders of National Rubber Machinery Co. at the annual meeting approved an increase in authorized shares to 300,000 from 200,000 and ratified a change in the code of regulations which moves the annual meeting from the first Monday in April to the last Friday of that month.

COMMITTEE D-11 HOLDS MEETING IN DETROIT DURING ASTM COMMITTEE WEEK

Committee D-11 on Rubber and Rubber-Like Materials of the American Society for Testing Materials, met in Detroit, Mich., on March 4 to 6 during the parent society's Committee Week, which was held from March 2 to 6, inclusive. It was reported that D-11 has been taking a very active part in the work of Technical Committee 45 on Rubber of the International Organization for Standardization. Several proposals under study in the ISO Committee were considered by Committee D-11. These will be reported upon at the next meeting of the ISO Committee to be held on June 15-23 in Paris.

Announcement was made of the appointment of J. F. Kerscher (Goodyear) as chairman of a new subcommittee authorized to develop specifications for rubber compounds for general application similar to the SAE-ASTM Specifications for Rubber and Synthetic Rubber Compounds for Automotive and Aeronautical Applications (ASTM D735; SAE 10R) which have been used so successfully in the automotive and aeronautical fields.

The various ASTM specifications for rubber insulated wire and cable have been rearranged and enlarged. A new master specification covering construction details of insulated wire and cable used for the distribution of electrical energy has been developed. It covers a number of subjects now included in Specifications D27, such as metal conductors, thickness of insulation, shielding, types of coverings, and cabling of multiple conductor assemblies. The individual purchase specifications will prescribe only the physical and electrical properties of specific types of compounds and each of these will refer to the master specification for construction details. All testing and sampling procedures for wire and cable are being consolidated into a single enlarged version of Methods D470.

Physical Testing Plans

The Subcommittee on Physical Testing has decided to undertake a survey of mill roll and stock temperatures during mixing that are now being used in various rubber laboratories. The types of buffer used in preparing samples for physical testing was also discussed. A survey will be made of the various types of buffers now being used in rubber testing.

New methods for the quantitative determination of dirt, copper, and manganese in rubber, and also methods for determining the vulcanization characteristics of crude rubber were completed by the Subcommittee on Crude Natural Rubber.

Action was also taken to instruct the American delegation which will attend the meeting of ISO Technical Committee 45 on Rubber in Paris to recommend that limitations be placed on the amounts of dirt, copper, and manganese that may be present in technically classified rubber and also a more adequate characterization of the vulcanization behavior of natural rubber. The price of natural rubber today is governed to a considerable extent by the amount and type of dirt present in the rubber.

It is well known that copper and manganese accelerate the deterioration of natural rubber both in the form of crude rubber and vulcanized products. Since large amounts of rubber are kept in storage for many years before use, it is important that the amounts be extremely small. Limitations will be placed on these amounts in technically classified rubber, D297-50T.

The most important physical property of natural rubber for technical classification is its vulcanization behavior. Variations in this characteristic cause considerable difficulty during manufacture and may result in defective products. The present system used in the technical classification of rubber characterizes the vulcanization behavior only in part. It was recommended that, in addition to measuring the strain or modulus of a vulcanizate cured 40 minutes at 140° C., the time of incipient cure and rate of cure be determined from the change in Mooney viscosity of the rubber compound as a function of time at vulcanizing temperatures.

Evaluation of Natural Rubber

It was announced that the Symposium on Recent Developments in the Evaluation of Natural Rubber, which had been sponsored by Committee D-11 at the 50th Anniversary of the Society in June, had now been published. Copies of the Symposium are available from ASTM headquarters.

Progress was reported in the cooperative study on correlation between oven and shelf aging of rubber. These tests cover aging periods of two, three, and four years; the next series is to be made at the end of eight years. The extensive data obtained will be analyzed by the new Subcommittee on Statistical Quality Control. This subcommittee is cooperating with Committee D-20 on Plastics in studies on the aging of plastics.

Action was taken on a revision of the four aging Methods D454, D572, D573, and D685 to require that samples be bench marked after completion of aging tests. The Aging Test by the Oven Method (D573) will provide tests at temperatures of 100 C. for higher temperatures in increments of 50° C.

The results of a cooperative study by eight laboratories of stress relaxation tests on soft gasket stocks was presented in an extensive report by C. K. Chatten (N. Y. Naval Shipyard). The over-all objective is to develop standard equipment and procedures.

Compression Set Tests

Revisions in the Test for Compression Set (D395) will eliminate any preheating of the compression device before inserting the specimen. In view of the current widespread interest in tests at elevated temperatures, Committee D-11 may appoint a task group to study this matter and recommend temperatures to be used. In many laboratories, ovens are maintained at specific temperatures and it is important to reach agreement.

The Methods for Changes in Properties in Liquids (D471) will be rearranged. A task group will review materials that should be excluded from this test, especially porous-type materials such as cellular rubber, sponge rubber, and materials containing fiber, cork, fabric, etc.

The Subcommittee on Adhesion Tests has in preparation a round-robin test program to study proposed revisions in the Test for Adhesion to Metal (D429).

Experience with the new Tentative Methods of Testing Adhesives for Brake Lining and Other Friction Materials (D1205-52T) show they give satisfactory reproducibility. These methods are for use in testing properties of the newer adhesives. They include two methods, one for evaluating the strength and permanence of bonds, and the other for measuring the shelf life of bonded cements, tapes, adhesive film, etc.

The Subcommittee on Hard Rubber decided to study two machines for drop impact tests on asphalt battery containers. Determining failure of the asphalt containers when subjected to hot and cold cycles was discussed, and tests are to be considered. The group will consider adapting the test for asphalt battery containers for hard rubber.

The Subcommittee on Low-Temperature Tests studied a proposed T-R test (temperature-retraction) procedure. This determines the retraction characteristics caused by a rise in temperature after it has been frozen in elongated condition to sufficiently low temperatures to cause it to lose practically all its elastic properties. This test is especially important with the increased use of rubber products under extreme low-temperature conditions. Retraction values give an over-all picture of low-temperature behavior including the effect of crystallization.

Variation Influence Studies

A report on Influence of Variations in Rotors, Dies, and Rate of Shear on Mooney Viscosity, by George E. Decker and Frank L. Roth (National Bureau of Standards) was presented to Subcommittee XXVI on Processibility Tests. As a result of these studies, revisions were recommended in the Test for Viscosity by the Shearing Disk (D927-52T).

A progress report was presented by the special Committee on Standard Samples which is cooperating closely with the National Bureau of Standards. One of the objectives of Committee D-11 is to establish a series of standard recipes and procedures for compounding and use in ASTM methods. The current Methods D15 do include a number of standard recipes. However, there is still no source available for the polymers nor for certain of the compounding ingredients, and work on this is continuing at the Bureau.

An extensive summary report was presented covering the many activities of the SAE-ASTM Technical Committee on Automotive Rubber. Under ASTM procedure this committee functions as a subcommittee of Committee D-11. The Section on Automotive Vibration Insulators has under way a round-robin study of oscillograph tests. It is also preparing a practical method for testing engine mounts.

There is considerable interest in colored

mounts in line with the current internal finish of automobiles. Several new methods had to be developed, such as tests for discoloration, water spotting, abrasion or scuff resistance, and evaluation of color coatings. Consideration is also being given to preparation of specifications.

An extensive outdoor static exposure testing program is being carried on at 18 test locations. A wealth of data has been secured from these tests. Ozone cabinet tests have been made on the same compounds used in the outdoor exposure test and a study will be made of the correlation. A new section is being organized to undertake work on a test procedure for impact testing of bumpers.

New specifications have been completed for rubber brake boots and revisions have also been completed in the SAE Specifications for Hydraulic Brake Cups. Important changes have been agreed upon in the Specifications for Non-Metallic Gasket Materials (ASTM D1170; SAE 90R). These are subject to approval by letter ballot. Proposed Specifications for O-Rings will contain provisions for classes of compounds, methods of test, and dimensional requirements. The Subcommittee X on Physical Testing, of Committee D-11, will be asked to consider a procedure for evaluating rubber by a bend test that can be used in connection with and as a supplement to an aging test.

Akron Presform to Expand

Akron Presform Mold Co. has announced an expansion of manufacturing facilities at its plant in Cuyahoga Falls, Ohio. Presform's facilities will be increased by 15,000 square feet with the addition of a 2-story building at one end of the present plant, and a newly-built wing at the other end. This will make a grand total of 35,000 square feet of manufacturing area at the Falls plant. Company officials stated that with the addition of this space it will be possible to streamline production. It was also pointed out that a major portion of this production is for the defense effort. Akron Presform Mold Co. was established in 1931. Since that time the company has engaged in the manufacture of aluminum forms for latex-dipped products, aluminum and steel molds, dies for rubber as well as plastics and various types of rubber working machinery.

Buys Dewey & Almy Division

Seamless Rubber Co. has announced the purchase of the Dip Goods Division of the Dewey & Almy Chemical Co., with the exception of a few items not compatible with the Seamless Rubber line. The company plans to move the dip operations from Cambridge, Mass. to New Haven, Conn., where it will be used to supplement the firm's present line. Seamless Rubber expects to add from 100 to 200 employees to the company payroll. The addition of the Dewey & Almy Division is expected to add substantially to the volume of sales of bladders for athletic goods, recoil pads, waders, parkas, beach balls and other sports and recreation items.

Runciman Joins Yale Rubber

Lyle F. Runciman

Lyle F. Runciman, former owner of Runciman Drug Stores, has sold out his drug business and has become associated with the Yale Rubber Manufacturing Co., Sandusky, Mich., as executive vice-president, according to Eldon H. Henderson, Yale Rubber president. Mr. Runciman, who had been in the retail drug business in Detroit since 1922, was a co-founder, with Mr. Henderson, of Yale Rubber and has been a stockholder since the firm's inception. Yale Rubber manufactures molded and extruded rubber products for the automotive, farm equipment, home appliance and other diversified industries. In addition to the Yale plant in Sandusky, the firm operates a plant in Lima, Peru, a jobbing branch in Detroit and nine sales offices throughout the country.

"Desert Tones" Rubber Flooring

The Flooring Division of the Goodyear Tire and Rubber Co. has announced the introduction of a new style group of rubber flooring called "Desert Tones". Created exclusively for Goodyear by Raymond Loewy Associates, this group of five new shades takes its theme from the subtle natural tones of the desert. The five shades are named Copper Canyon, Desert Dawn, Santa Fe Skies, Sahara Sands and Silver Shale and mark recognition of a new color trend. Desert Tones reflect the beauty and rich, warm colors of the desert lands, easy to live with colors that are becoming so popular in today's modern decorating trends. The new Desert Tones are available in both tile and roll goods in three gauges, 3/32 inch, ⅛ inch and 3/16 inch.

Goodrich Exercises Land Option

B. F. Goodrich Co. of Akron has exercised an option to purchase a plot of land near Defiance, Ohio, for possible future use as a site for a new plant. The company said there are no present plans to build a tire and tube plant on the site, as has been reported, but that "Goodrich was being provident in preparing for the future."

VINYL SHEETING MANUFACTURERS SET NEW SHIPMENT HIGH IN 1952

The manufacturers of vinyl-coated fabric and vinyl sheeting registered their biggest year in 1952, according to year-end figures recently released by the Plastic Coatings and Film Association, New York, N. Y. Shipments of vinyl sheeting were up 16.7% over 1951 while vinyl-coated fabric shipments showed a gain of 13.4%.

The 1952 total for plastic-coated fabrics was 45,706,722 linear yards compared to shipments in 1951 of 40,294,656 yards, an increase of 5,412,066 linear yards. Shipments of plastic sheeting 10 mils and over totaled 57,804,749 square yards in 1952 compared to 49,507,551 yards in 1951, an increase of 8,297,198 square yards. These figures are based on reports from PCFA members and cooperating companies which represent a substantial majority of the nation's output of plastic-coated fabrics, all-plastic sheeting and pyroxylin-coated materials.

In releasing the year's statistics, S. Ernest Kulp of the Masland Duraleather Co., president of the PCFA, pointed out that the high 1952 volume reflected steady business throughout the year capped by a strong 4th quarter. In the case of vinyl-coated fabrics, he said, the December volume was the highest ever recorded by that section of the industry. Shipments of pyroxylin-coated fabrics for 1952 totaled 30,213,385 linear yards, a decline from the 1951 figure of 34,146,210 yards.

Of the 45,706,722 linear yards of vinyl-coated fabrics shipped during 1952, 38,847,911 yards were heavy-weight fabrics (based on weight of finished goods, coating plus cloth, over 10 ounces per square yard). In 1951, shipments of heavy-weight coated fabric totaled 32,578,899 yards. Light-weight coated fabrics (10 ounces and under per square yard finished weight) accounted for 4,201,018 yards in 1952 as against 5,171,565 yards in 1951. A total of 2,657,793 linear yards of custom coated materials were shipped in 1952 compared to 2,544,192 yards in 1951.

Shipments of vinyl sheeting 10 mils and over in 1952, as reported by the PCFA, were 57,804,749 square yards as compared to 49,507,551 yards in 1951. Medium weight sheeting (10 to 15 mils inclusive) accounted for 34,952,476 yards of the 1952 total compared to 31,650,611 yards in 1951. Medium-heavy weight sheeting (16 to 19 mils inclusive) came to 4,055,546 square yards in 1952 as against 1,323,196 yards for 1951. Heavy weight sheeting (20 mils and over) accounted for 18,796,727 square yards in 1952 as compared to 16,533,744 yards in 1951.

Columbian Carbon Credit

Columbian Carbon Co. made another $1,000,000 takedown under a $20,000,000 revolving credit set up with the Guaranty Trust Co. in July, 1952. The second biggest carbon black maker told the New York Stock Exchange the loan brought to $6,000,000 the amount outstanding under the credit line, which called for 3% interest until June 30, 1953, 3¼% thereafter to maturity June 30, 1954.

NAMES IN THE NEWS

ALFRED L. MILLER, formerly associated with the Celanese Corporation of America, has joined the International Latex Corp., Dover, Del., as a group leader in high polymer research.

CYRIL S. KIMBALL, previously vice-president of Foster D. Snell, Inc., has been promoted to executive vice-president.

RAYMOND E. LAPLANT, associated with the Brown Co. for the past four years, has been named Southwest district representative for the Bermico Sales Division of the firm. He will also represent the Pulp Division in the sale of "Solka-Floc."

SAMUEL S. BOARD, JR., associated with the Farrel-Birmingham Co. since 1938, has been named director of research at the firm's Buffalo, N. Y., plant.

DON S. BOLLEY, formerly director of research for the Baker Castor Oil Co., has been named technical director. M. KENT SMITH, previously director of development, has been appointed director of commercial chemical development.

DR. RAYMOND W. MCNAMEE, superintendent of the Research and Development Department of the Carbide and Carbon Chemicals Co., South Charleston, West Va., has been chosen by the Georgia Section of the American Chemical Society to receive the 1953 Herty Medal for outstanding contributions to chemistry in the Southeast.

DR. TURNER ALFREY, JR., associated with the Dow Chemical Co. since 1950, has been appointed assistant director of the firm's physical research laboratory.

MARTIN T. DILLON, for the past thirty years associated with the Boston Woven Hose & Rubber Co., has been appointed manager of the New York Division of the concern.

W. S. SIMPSON has been elected a vice-president of Raybestos-Manhattan, Inc., in charge of the Raybestos Division. M. A. THOMPSON has been appointed assistant comptroller of the corporation.

LEO J. WALL, formerly associated with the Firestone Tire & Rubber Co., has been appointed factory superintendent of the Yale Rubber Manufacturing Co.

WILLIAM T. BAIRD, JR., president of the Baird Rubber and Trading Co., recently returned from a trip to the continent where he visited the company's various connections.

E. T. COLLINSWORTH, JR., previously director of business research of the Phosphate Division of the Monsanto Chemical Co., has been named vice-president of the Velsicol Corp.

EDWARD T. DAY, associated with the U. S. Rubber Co. since 1934, has been named manager of branch sales for the Mechanical Goods Division. MATTHEW J. DELEHAUNTY, with the firm since 1922, has been named manager of industrial sales for the division.

ELDON H. HENDERSON, president of the Yale Rubber Manufacturing Co., has been elected a director of the Michigan Mutual Liability Co., Detroit, Mich.

CHARLES H. PARCELLS, previously supervisor of labor relations for the U. S. Rubber Co., has been appointed assistant director of industrial relations. ROBERT E. LOWELL has been named to succeed Mr. Parcells as supervisor of labor relations, while HARRY J. INGRAM has been appointed assistant supervisor of personnel and training.

WILLIAM R. LANTZ, vice-president and director of purchases of the Sun Rubber Co., has been elected a vice-president of the National Association of Purchasing Agents.

DEWITT O. MYATT, formerly managing editor of *Industrial and Engineering Chemistry*, has been named to the newly created position of manager of development of the Atlantic Research Corp., Alexandria, Va.

RICHARD N. WILLIAMS has been assigned to the Chicago Regional Sales Office of Sharples Chemicals Inc., while DONALD C. WATERMAN has been assigned to the New York Regional Sales Office and is currently on special assignments.

F. K. LACHER has been elected secretary, MISS BETSY FROST, assistant secretary, and C. L. RAKER, controller of the National Rubber Machinery Co.

JOHN L. COLLYER, chairman and president of the B. F. Goodrich Co., has been elected chairman of the Cornell University Board of Trustees. He is a graduate of the class of 1917.

DR. EMIL OTT, director of research for the Hercules Powder Co., has been elected president of the American Section of the Societe de Chimie Industrielle.

WALTER J. GRUBER, formerly associated with the McGean Chemical Co., has joined the Witco Chemical Co. where he will supervise the manufacture of paint driers at the Chicago plant. He will also be engaged in technical service on these products.

HAROLD M. WINTON, formerly training director for the Mechanical Goods Division of the U. S. Rubber Co., has been named to the newly-created post of sales development manager for the division.

Named Assistant Research Director

Dr. Leland M. White

Dr. Leland M. White has been appointed assistant director of the Research and Development Department of U. S. Rubber Co., according to an announcement by Dr. S. M. Cadwell, director of the department. Dr. White joined the company's Research and Development Department in 1940, and has been head of the Rubber Applications Department at the Passaic, N. J. general laboratories since 1947. He was succeeded in the latter position by Dr. B. C. Barton. A native of Kansas, Dr. White was graduated from Ottawa University, and received his M.A. and Ph.D. degrees at Kansas University.

WILLIAM J. SMYTHE, formerly associated with the Monsanto Chemical Co., has joined the Elastomer Chemical Corp., Newark, N. J., as technical service manager.

ROBERT D. BONNEY, director of manufacturing for Congoleum-Nairn, Inc., Kearny, N. J., has been elected vice-president in charge of manufacturing and a member of the board of directors.

DR. HENRY F. PALMER, vice-president of the Kentucky Synthetic Rubber Corp., was recently honored as "Boss of the Year" by the National Secretaries Association.

MIRON B. ALLEN, previously assistant manager of industrial sales for the Paint Division of the Pittsburgh Plate Glass Co., has been named sales manager of the Forbes Finishes Division of the company.

LEE A. POTTER, JR., president of Forman, Ford & Co., Minneapolis, Minn., has been elected president of the Young Presidents Organization for 1953-54.

GERALD REINSMITH, previously materials engineer for the Ordnance Department, has been named manager of the Washington, D. C., office of Narmco, Inc.

M. A. MACDONALD, for the past five years associated with the Stauffer Chemical Co. on the West Coast, has joined the Midwest Rubber Reclaiming Co. in a technical sales capacity.

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STATEX-B

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STATEX-M

◆

HMF (High Modulus Furnace)

STATEX-93

◆

SRF (Semi-Reinforcing Furnace)

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NEWS IN BRIEF

General Aniline & Film Corp., New York, N. Y., has announced the availability of a new bulletin on propargyl alcohol (2-propyn-1-ol).

A new four-page catalog on its water hose has been published by Goodrich. In addition to hose for general water service, the catalog describes types of water hose designed for specialized uses.

First issue of a new pocket-size, three-color publication called "Chemmunique" has been made available by the Atlas Powder Co., Wilmington 99, Del. The publication, to be issued on alternate months, presents helpful information on new and old uses of Atlas chemical products.

Celanese Corp. of America has issued a new technical bulletin on Trioxane, a crystalline form of formaldehyde. Ask for New Products Bulletin N-31-1.

Reductions in the development prices of two high-pressure acetylene derived glycols, butynediol and butanediol, have been announced by the General Aniline & Film Corp. The price of 35% butynediol solution has been lowered to 20c a pound, or 57c a pound on a 100% basis. The price of 1,4-butanediol has been lowered to 60c a pound.

Bacon Industries, Inc., Watertown, Mass., has released a new data sheet which provides detailed specifications on silicone rubber O-rings manufactured by the company. Ask for Technical Data Sheet No. 103.

Drake America Corp. has been designated as exclusive overseas representatives for the complete "Norwalk" line of auto and truck and bus tires manufactured by the Armstrong-Norwalk Rubber Corp., Norwalk, Conn.

Rockefeller Sports Car Corp., Rockville Center, N. Y., is producing a new sports car which has a body made from Fiberglas and Vibrin, a polyester resin produced by Naugatuck Chemical.

Air therapy units produced by Continental Hospital Service, Inc. of Cleveland, Ohio for patients suffering from respiratory difficulties, utilize a canopy of Goodyear Pliofilm.

Propargyl alcohol (2-propyn-1-ol) and propargyl bromide (1-bromopropyne) are now available in drum lots from the General Aniline & Film Corp.

Goodyear's Chemical Division has announced that more than 125,000,000 pounds of GR-S manufactured in 1952 were protected against oxidation by "Wing-Stay S", non-staining antioxidant produced by the division.

Newark Stove Co. of Newark, Ohio, is presently producing a new line of lawn mower wheels made of Kralastic, the rubber-plastic blend produced by Naugatuck Chemical.

A new quality Koroseal upper material for all types of shoes has been introduced by the Shoe Products Sales Division of Goodrich.

Calco Chemical Division of the American Cyanamid Co., Bound Brook, N. J., has prepared a new technical bulletin on "NOBS Accelerator No. 1."

The Chemical Division of General Tire has appointed C. P. Hall Co. as exclusive sales agent for Kalabond in the entire United States excepting California, Oregon and Washington.

A rubber putty, called "Plastikon", that is watertight, airtight and does not become brittle is described in a catalog just published by Goodrich.

A four-page, two-color folder describing equipment and facilities for the production of machined parts has been issued by the Stryker Machine Products Co., Trenton, N. J.

A new four-page, two-color brochure on low-cost permanent non-electric Model C plate magnets, applicable to all but the heaviest tramp iron removal problems, has been issued by the Eriez Manufacturing Co., Erie, Penna.

A new handbook designed for the chemistry teaching-assistant entitled "Handbook for Chemistry Assistants", is now available from the Educational Service Department, Fisher Scientific Co., Pittsburgh 19, Penna. The manual was prepared by a committee of the Division of Chemical Education of the American Chemical Society.

Compounding Research Reports

Compounding research reports on some of its major rubber chemicals have recently been prepared by the Naugatuck Chemical Division of the U. S. Rubber Co., Naugatuck, Conn. Among materials covered in these newer reports are Aminox, an antioxidant for imparting resistance to oxidation and heat deterioration; Octamine, a solid amine type antioxidant offering minimum discoloration with maximum protection, and Tonox, a general toner for improving the properties of natural and synthetic rubbers. Copies of these reports are available from the company on request.

Waiting for your copy of the 1953-54 RUBBER RED BOOK? Complete and return all questionnaires quickly!

Technical Bulletins on Neoprene

The Rubber Chemicals Division, E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Delaware, has issued a number of technical reports on neoprene and neoprene latex in recent months. The titles of these bulletins, with the bulletin numbers shown in parentheses, are as follows: The Influence of Other Elastomers on the Low Temperature Properties of Neoprene Vulcanizates (BL-245); Neoprene Compounds —ASTM D-735 and SAE Standard R-10 (BL-244); Control of Migration in Neoprene Latex Saturated Paper (PR-1); Low Brittle Point Neoprene Compounds That Are Fungus Resistant (BL-247); Thiuram M-Tepidone for High Tensile Strength Neoprene Latex Films (BL-246). Copies of these technical bulletins are available on request to the company.

Pigment Blacks Data Sheet

A typical data sheet in chart form of the pigment blacks produced by the Witco Chemical Co., New York, N. Y., is now available. Covering Witcoblak Hitone, Witcoblaks Nos. 11, 32, 50, 100, F-1, F-2 and F-3, and Witcolith No. 2, the sheet shows the color on the nigrometer scale, oil absorption, average particle size, approximate surface area, maximum moisture, fixed carbon, adsorbed volatile, specific gravity, weight per solid gallon, apparent density, tinting strength, sludge pH, ash content, per cent of benzol extract and whether or not it is available in pellet form. The main fields of application for each black are also given including ink, paint, paper, plastic, records, fertilizer, roofing granules and carbon paper and ribbon.

Hycar Used in Helicopters

According to a recent announcement, many vital parts of the new Piasecki helicopters are made from Hycar rubber, product of the B. F. Goodrich Chemical Co. On the HUP helicopter, which is used by the Navy aboard aircraft carriers, battleships, and cruisers, one of the most important Hycar parts is the rotor spinner bellows. This bellows, molded by the Surgical Rubber Co., Norristown, Penna., operates with the rotor pitch control link to shield the working parts of the rotor from rain water and salt spray. The bellows is continually flexing since rotor blade angles are changing constantly. Various other Hycar parts including seals and gaskets are also used on the helicopters.

"Puncture Seal" Truck Tubes

Goodyear Tire & Rubber Co. has introduced a new line of "Puncture Seal" truck tubes, made of Butyl rubber. The new tubes will seal against air leakage for much longer periods while the puncturing object remains in the tire, due to major improvements in the sealant and process of manufacture, the company states. The Butyl tube, according to the company, also has another feature in that the sealant in the tube will not flow. Thus, there is no liklihood of the tire becoming unbalanced at high speeds and under high temperatures. The tubes are available in a wide range of truck tire sizes.

ARMED FORCES HOLD SYMPOSIUM ON LOW-TEMPERATURE TESTING

John R. Britt, materials engineer for the Elastomer Branch of the Research and Development Division, Bureau of Ships of the Department of the Navy, has drawn up a report on the Second Armed Forces Symposium on "Low-Temperature Testing of Rubber" which was held on February 3 at the Pentagon in Washington, D. C. The symposium was held to discuss the progress made on the standardization of methods and test equipment for use in military procurement specifications for rubber items intended for low-temperature applications.

At the first symposium held in March, 1952, the use of the following low temperature tests and related apparatus was agreed upon: *Brittleness Test*—ASTM D746 (motor or solenoid actuated); *Hardness Test*—The Pusey and Jones Plastometer or Admiralty Indentometer as specified in Federal Specification ZZ-R-601; *Stiffness Test*—Gehman apparatus; *Elastic Recovery*—Compression set, temperature retraction, or tension recovery apparatus.

During the past year the various activities of the Army, Navy, and Air Force reviewed and continued the study of the above test methods and equipment. The ASTM Method D746 brittleness test has been incorporated into the latest revision of Military Specification MIL-R-3065 and the bending beam stiffness test method of Federal Specification ZZ-R-601 has been eliminated from Military Specification MIL-R-900.

Brittleness Testing Discussed

ASTM Method D746 for brittleness testing was discussed by those present and the difficulties encountered using the solenoid operated apparatus were brought out. One laboratory, using this apparatus, presented data showing the effect of the number of test specimens on the brittle point determined. It was shown that when from one to three specimens were tested simultaneously there was no change in the brittle point. But when four or more specimens were tested at one time the brittle points determined were lowered.

Also discussed were the variations in the force applied to the samples when using the solenoid operated method, apparently caused by voltage variations. It was agreed that additional study of the two instruments, solenoid and motor driven, was desirable and that the Armed Forces laboratories should collaborate with Sub-Committee XXV of ASTM Committee D-11 in arriving at a satisfactory test method.

The Admiralty Indentometer hardness tester as specified in the revision of Federal Specification ZZ-R-601, soon to be issued, was agreed upon as being more desirable for testing rubber hardness at low temperatures because of some difficulties encountered when using the Pusey and Jones instrument at these temperatures. Several laboratories indicated their desire to obtain Indentometer instruments but because there is no commercial supplier of the instrument, they have been hindered in doing so. It was proposed to determine the possibility of developing a commercial source of supply for the Admiralty Indentometer, which is the New York Naval Shipyard Material Laboratory's modification of the British Admiralty Rubber Meter.

As regards the stiffness test, the Gehman instrument is currently being used by a number of the Armed Forces laboratories to gather data for specification use. In the past year more laboratories have received or have built Gehman instruments and are obtaining data for comparison with older methods and are developing a suitable procedure of operation. Plans were initiated to conduct a limited round-robin test to determine substitution values for the Gehman, Clash Berg and the bending beam method of ZZ-R-601. These values could then be incorporated in specification test changeovers to the use of the Gehman test agreed upon at the last meeting.

The compression set test is already in widespread use for the measurement of low temperature elastic recovery. Little discussion took place at this meeting on either the temperature-retraction or the tension recovery procedure except to point out the rather severe stresses to which the rubber is subjected. In many cases, this is out of proportion to the stresses the rubber would undergo in actual service. The study and evaluation of both methods will be continued in the various Armed Forces laboratories. The instruments and methods agreed upon at the First Armed Forces Low Temperature Testing Symposium are being incorporated in Federal Specification ZZ-R-601.

Round Table Discussion

The symposium closed with a round table discussion relative to variations in testing procedures and conditions that the several Armed Forces laboratories employ when conducting low temperature tests. The various temperatures at which specification tests are run were discussed. It developed that those temperatures which are at variance with those usually used by all are needed for some special end item requirement by a particular branch of service.

The test media used to condition the samples were also found to vary among the various laboratories. One laboratory presented the data showing that a one-hour conditioning period in air gives the same results as when the samples are conditioned three minutes in a liquid medium. This positive correlation was found in both Admiralty Indentometer hardness measurements and in brittle point determinations made using a Scott solenoid tester. Another laboratory reported its experience using liquid media for conditioning baths. The bath, in this case methanol, showed little if any deleterious effect upon the samples undergoing compression set tests.

The importance of the accuracy of the temperature indicating devices used was also pointed out. The laboratories use various types of thermometers or thermocouples in determining temperatures which are subsequently reported in round-robin studies and used for correlation purposes. In the past this has been a repeated source of error in correlation studies. It was felt more attention should be given to standardizing these devices as well.

It was agreed to poll those Armed Forces laboratories represented regarding their recommendations as to test temperatures required or desired, test media for conditioning the samples, and periods of conditioning. With the results of this poll in hand it is hoped to be able to standardize the testing procedures and conditions, as well as the specification test apparatus, for use in Armed Forces procurement specifications.

VINYL SPECIALTIES

A light-weight high tension aircraft lead wire manufactured by the Scintilla Magneto Division of the Bendix Aviation Corp., consists of multiple layers of nickel braid with a plastic made from Geon vinyl paste resin sandwiched between each layer.

Industrial Synthetics Corp., Garwood, N. J., has introduced a new featherweight sprinkler made of vinyl plastic. The unit is called the "Suplex Flexible Sprinkler."

The Flooring Division of Goodrich has introduced a new Koroseal floor tile which requires no waxing and which is said to actually improve in appearance with wear.

Ball Acquires Plastics Interest

Ball Brothers Co., Inc., Muncie, Ind. has announced its entrance into a new field of manufacturing with the acquisition of a majority interest in Kent Plastics Corp. of Evansville, Ind. Ball acquired its Kent interest in exchange for a substantial capital investment made in underwriting an expansion which the Evansville concern found necessary because of increasing demands for Kent products. Kent, organized in 1945, makes a broad line of functional and decorative parts for the automotive and home appliance industries and employs approximately 500 people. The announcement followed the recent annual meeting of Kent stockholders at which five members of the Ball Brothers board of directors were voted into the membership of the Kent board. All incumbent Kent officers and directors were re-elected. New members of the Kent board included Edmund F. Ball, president of Ball Brothers, Duncan C. Menzies, Ball executive vice-president and general manager, Alexander M. Bracken, vice-president and general counsel, John W. Fisher, vice-president and Ball director of Commercial Glass Container Sales, and George E. Myers, vice-president and treasurer of the Ball system. Kent officers and directors renamed were Robert H. Morehouse, president, Lawrence H. Haase, vice-president, John H. Wall, secretary, and Joseph F. Derr, treasurer. Presidents of the two companies said that there would be no change either in present management personnel or in the policies of the Kent management. The present management continues to represent a substantial ownership of Kent Corp. with the Ball company the only other stockholder.

Reports on Camelback Complaints

The Rubber Manufacturers Association reports complaints continue to come from retreaders that camelback they have purchased in good faith turns out to be of poor quality. These complaints have led the Association to caution the trade not to be misled by brand names cleverly contrived to imply high quality or long-service; by technical gibberish, or by lavish claims concerning expected performance. Some suppliers still represent their camelback as "Grade A" or "Grade C" because they were the quality designations established by the Office of Price Administration during World War II. At that time these "Grade A" and "Grade C" designations complied with OPA specifications which established definite minimum values for those properties on which camelback quality depends. These designations also had the prestige of the United States government and its willingness to prosecute any firm that did not comply with the specification requirements for these two permitted grades.

The Association points out that "Grade A" and "Grade C" designations for camelback as measures of quality are meaningless now. When the Office of Price Administration passed out of existence in 1947, the government's specifications and "policing" also terminated. Therefore, retreaders are cautioned not to accept labels of "Grade A" and "Grade C" as measures of quality and to beware of those brands for which exaggerated claims are made. The Association suggests that the retreader's best assurance of quality camelback for quality jobs is still the old-fashioned yardstick of purchasing brands from manufacturers who have earned reputations for dependable high quality merchandise and honesty and fair dealing with the trade. Such manufacturers share with intelligent retreaders the long view regarding the future growth and popularity of tire recapping and retreading.

Phillips Introduces Philblack I

Phillips Chemical Co. is now in commercial production of "Philblack I", a new intermediate super abrasion furnace (ISAF) black, at its Borger, Texas plant. Philblack I is designed to give passenger car tire treads increased mileage under the severe conditions imposed by today's new and more powerful automobile engines. This new ISAF black fills the gap between Philblack O (HAF) black and Philblack E (SAF) black. Philblack I imposes no additional processing problems. It may be substituted for Philblack O part for part in conventional tire tread recipes, the company states.

R.I. Holds Spring Meeting

Approximately 165 members and guests of the Rhode Island Rubber Club attended the Spring Meeting held on April 16th at the Metacomet Golf Club in East Providence, R. I. Principal speaker of the evening was A. J. Marchessault of the Boston Office of the Federal Bureau of Investigation. R. G. Volkman (U. S. Rubber) acted as chairman for the meeting.

Spencer Rubber Names Lloyd

Harry R. Lloyd

Spencer Rubber Products Co., Manchester, Conn., has named Harry R. Lloyd sales manager of the recently created Molded Rubber Division. Mr. Lloyd was formerly general sales manager of Davidson Rubber Co., Boston, Mass. Before that, he was sales service manager of Sponge Rubber Products, Shelton, Conn., and, earlier, assistant to the sales manager of Spencer, Inc., New Haven, Conn. From 1935 to 1940, he was assistant to the operating manager of Fisk Tires, a division of U. S. Rubber Co., Chicopee Falls, Mass. Mr. Lloyd will direct all sales activities of Spencer's Molded Rubber Division, which is engaged in manufacturing precision molded rubber products.

Seiberling Officers Re-elected

All officers of the Seiberling Rubber Co. were re-elected at the annual meeting of the board of directors on April 20 in Akron. Previously, on April 13, stockholders re-elected all company directors. Stockholders were also advised that the company now owns 99.4% of the capital stock of the Seiberling Rubber Co. of Canada, and that it expects to acquire 100% ownership in the near future. Previous ownership in the Canadian company had been limited to 84.5%. The change in status was brought about by an offer to minority stockholders of the Canadian firm to exchange their stock in that concern for stock in Seiberling Rubber Co. of Akron on the basis of two shares of parent company stock for one share of the Canadian company stock.

WASHINGTON APPOINTMENTS

Kenneth R. Cravens, St. Louis banker, has been nominated as administrator of the Reconstruction Finance Corporation by President Eisenhower, succeeding Harry A. McDonald.

Robert W. Koch, director of purchases for the Firestone Tire & Rubber Co., has been named as a special assistant to the Secretary of Defense to secure effective and efficient procurement methods and operations throughout the Department of Defense.

Aerojet and Crosley Merged

Aerojet Engineering Corp., Azusa, Calif., and Crosley Motors, Inc., Cincinnati, Ohio have been merged with the consolidated concern now known as the Aerojet-General Corp. with headquarters in Cincinnati. William O'Neil, chairman of the board and president of the General Tire & Rubber Co., majority stockholder in both the Aerojet and Crosley firms, has been elected president of Aerojet-General. The merger agreement provides that each share of $10.00 par value Crosley common stock will be converted into 1.4 shares of common stock of the consolidated corporation of $10.00 par value. Each share of Crosley convertible preferred stock will remain outstanding and will represent one share of convertible preferred stock of the consolidated corporation with the same terms and provisions as presently exists. Each share of class "A" no par value capital stock of Aerojet will be converted into 20 7/10 shares of Aerojet-General $10.00 value common stock. Authorized common stock of Aerojet-General has been increased from 600,000 shares to 1,200,000 shares, of which 531,683.3 shares are unissued. With 396,716.7 shares of $10.00 par value common stock and 2,716 shares of $1,000 par value convertible preferred stock outstanding, the stated capital of Aerojet-General is $6,683,167. Powel Crosley, Jr. former president of Crosley Motors, Inc., owns all the outstanding preferred stock of the consolidated firm. Meanwhile, General Tire has announced that it is going to transfer all of its metal fabrication work to the former Crosley Motors plant in Cincinnati, and similar work at the factory in Bowling Green will be tapered off. The Bowling Green plant will be sold as soon as all production is transferred to Cincinnati.

Gates Club Hears Huber

Hans Huber, president of the J. M. Huber Corp., addressed the recent monthly meeting of the Gates Rubber Co. Technical Club at the Park Lane Hotel in Denver. Mr. Huber said that in the last few decades man has destroyed, used, and wasted more of the earth's natural resources than the constructive forces of nature were able to deposit in many millions of years. Man's most pressing need, he declared, is to get along with himself and the forces of nature. He challenged those present that never before had there been a greater opportunity for lasting achievement in correctly applying the knowledge of science.

Southern Ohio Hears Throdahl

The Spring Meeting of the Southern Ohio Rubber Group held at the Engineer's Club in Dayton, Ohio, attracted approximately 75 members and guests. Principal speaker of the evening was M. C. Throdahl, manager of the Rubber Chemicals Section, Monsanto Chemical Co., Nitro, West Va. Mr. Throdahl gave a history of the development of chemicals used in rubber compounding, with some emphasis on the chemical protection of rubber against ozone attack. His talk was accompanied by slides.

FINANCIAL NEWS

Intercontinental Rubber Co.

For 1952: Net income of $11,618, which is equal to 2c a capital share, against $473,625, or 79c a share, in the previous year. Sales in 1952 totaled $438,265, against $1,782,452 in 1951. Current assets as of December 31, 1952, totaled $1,490,400, while current liabilities were $29,458. At the end of the preceding year, current assets were $1,700,713, and current liabilities were $240,120. The report covers the company and its subsidiaries.

Okonite Company

For 1952: Net profit of $2,123,977, which is equal to $13.36 a common share, compared with $1,509,886, or $10.12 a share, in 1951. In the quarter ended March 31, net profit was $714,216, which is equal to $4.49 a common share, contrasted with $530,971, or $3.56 a share, in the corresponding period of the preceding year.

McNeil Machine & Engineering Co.

For 1952: Net profit of $1,422,702, which is equal to $2.84 a common share, compared with $1,371,500, or $2.74 a share, in 1951. Sales of the company and its wholly-owned subsidiary, Cleveland Crane and Engineering Co., in 1952, totaled $20,472,300, 18.4% above the $17,293,419 reported in 1951.

Johns-Manville Corp.

Quarter Ended March 31: Net profit of $4,943,491, which is equal to $1.56 a common share, compared with $5,508,387, or $1.74 a share, in the first quarter of the previous year. Net sales in the first quarter of 1953 amounted to $57,255,485, against $56,075,789 in the first quarter of 1952.

Flintkote Company

Quarter Ended March 31: Net income of $745,666, which is equal to 53c a common share, compared with $382,282, or 24c a share, in the corresponding quarter of the previous year. Net sales in the first quarter of 1953 totaled $17,629,221, against $14,901,483 in the first quarter of 1952.

Armstrong Rubber Co.

Year Ended February 22: Net income of $575,729, which is equal to $1.38 a common share, compared with $764,863, or $1.91 a share, in the previous fiscal year. Net sales in the year ended February 22, 1953, totaled $22,392,276, against $17,529,189 in the year ended February 22, 1952.

Dewey & Almy Chemical Co.

Quarter Ended March 31: Net profit of $144,709, which is equal to 16c a common share, compared with a net loss of $23,529 for the same period of last year. Sales in the 1953 quarter amounted to $7,243,846, against $5,787,961 in the 1952 quarter.

American Cyanamid Co.

Quarter Ended March 31: Net income of $9,453,909, which is equal to $1.10 a share, compared with $8,814,695, or $1.03 a share, in the first quarter of the preceding year. Net sales in the first quarter of 1953 totaled $102,832,189, against $93,880,859 in the corresponding period of 1952.

DeVilbiss Company

Quarter Ended March 31: Net profit of $246,297, which is equal to 82c a capital share, compared with $222,675, or 74c a share, in the first quarter of the preceding year. Net sales in the first quarter of 1953 amounted to $4,767,467, against $5,017,855 in the first quarter of 1952.

Mansfield Tire & Rubber Co.

For 1952: Net income of $1,330,099, which is equal to $2.41 a common share on net sales of $55,551,843, compared with $2,107,414, or $3.79 a share on net sales of $66,831,583 in the previous year.

Thermoid Company

For 1952: Net income of $1,084,832, which is equal to $1.20 a common share on sales of $36,749,443, compared with $1,742,460, or $2.02 a share on sales of $37,836,200 in the previous year.

Cooper Tire & Rubber Co.

For 1952: Net profit of $322,131, which is equal to $2.05 a common share on net sales of $17,056,035, compared with $329,947, or $2.10 a share on net sales of $17,713,010 in 1951.

Textileather Corp.

For 1952: Net profit of $254,305, which is equal to 43c a common share on net sales of $16,617,964, compared with $278,861, or 47c a share on sales of $16,372,761 in 1951.

Circle Wire & Cable Corp.

For 1952: Net income of $2,293,444, which is equal to $3.05 a share, on record net sales of $24,392,944, compared with $2,064,376, or $2.75 a share on sales of $17,603,069 in 1951.

Goodall Rubber Co.

For 1952: Net income of $292,894, which is equal to $2.56 a common share on net sales of $9,137,493, compared with $420,393, or $4.30 a share on sales of $10,686,112 in 1951.

Asbestos Manufacturing Co.

For 1952: Net profit of $43,658, which is equal to 5c a common share on net sales of $3,709,164, contrasted with $75,783, or 13c a share on sales of $2,897,981 in 1951.

Boston Woven Hose & Rubber Co.

Year Ended February 28: Net income of $117,342, compared with $366,511 in the previous fiscal year. Net sales for the year ended February 28, 1953, amounted to $7,748,102, against $9,558,902 in the year ended February 29, 1952. Total current assets for the 1953 fiscal year amounted to $7,830,554, contrasted with $8,573,363 at the end of the previous fiscal year. Total current liabilities as of February 28, 1953, totaled $1,302,684. As of February 29, 1952, total current liabilities were $3,389,376.

St. Joseph Lead Co.

Quarter Ended March 31: Net income of $2,009,118, which is equal to 74c a common share on net sales of $24,393,379, compared with $3,575,942, or $1.31 a share on sales of $30,864,031, in the first quarter of the preceding year.

Acushnet Process Co.

For 1952: Net income of $390,799, which is equal to $1.95 a common share on net sales of $9,664,983, compared with $447,770, or $2.24 a share on net sales of $9,507,333, in the previous year.

Armstrong Cork Co.

Quarter Ended March 31: Estimated profit of $2,559,000, which is equal to $1.64 a share, compared with $1,977,000, or $1.23 a share, in the first quarter of the previous year.

General Cable Corp.

Quarter Ended March 31: Net income of $1,405,821, which is equal to 64c a common share, compared with $1,234,206, or 55c a share, in the same period of the previous year.

New Jersey Zinc Co.

For 1952: Net profit of $12,060,192, which is equal to $6.15 a share, compared with $9,913,553, or $5.06 a share, in the previous year.

Whitney Blake Co.

For 1952: Net income of $451,591, which is equal to $2.26 a common share, compared with $517,078, or $2.58 a share, in 1951.

Garlock Packing Co.

For 1952: Net income of $1,304,205, which is equal to $3.11 a common share, compared with $1,943,443, or $4.64 a share, in 1951.

National Rubber Machinery Co.

For 1952: Net profit of $532,900, which is equal to $3.03 a common share, compared with $675,628, or $3.84 a share, in 1951.

American Wringer Co.

For 1952: Net profit of $448,791 on net sales of $12,924,079, compared with $498,874 on sales of $10,392,681 in 1951.

SUBCOMMITTEE XII OF ASTM D-11 REPORTS ON MEETING IN DETROIT

Subcommittee XII on Crude Natural Rubber of Committee D-11 on Rubber and Rubber-Like Materials of the American Society for Testing Materials met on March 5 at the Hotel Tuller in Detroit, Mich., with approximately 40 members and guests in attendance. The chairman of the subcommittee, Norman Bekkedahl (National Bureau of Standards) announced that C. O. Miserentino (Dunlop Tire), a member of Subcommittee XII and also of the Crude Rubber Committee of the Rubber Manufacturers Association, had been appointed official liaison officer between the two committees and that this action would be very helpful in strengthening the position of Subcommittee XII when representing American natural rubber interests in international organizations.

Mention was made of the report of a survey of the needs and requirements of the rubber goods manufacturing industry with regard to dirt in natural rubber, which had been published in the January 1953 issue of *India Rubber World*, entitled, "A Survey of the Dirt Content of Natural Rubber," by K. F. Heinisch, Indonesian Rubber Research Institute. Information on the views of the American rubber industry was obtained from Subcommittee XII's task group on dirt contamination.

The chairman presented some suggested recommendations which should be considered by Subcommittee XII for submission at the June 1953 meeting of the International Organization for Standardization, Technical Committee 45 on Rubber. These recommendations covered (1) two methods for the determination of dirt developed by Subcommittee XII, which are published in ASTM Special Technical Publication No. 136, entitled, "Symposium on Recent Developments in the Evaluation of Natural Rubber," (2) the existing ASTM procedures for the determination of copper and manganese in ASTM Designation D 297-50T, with possible modifications as described for copper in an article in *Rubber Age* (N.Y.), Vol. 71, pp. 64-66 (1952), and (3) measurement of vulcanization behavior to include scorch time according to ASTM Designation D 1081-49T and cure rate. Cure rate determination from the viscosity measurements is not included in D 1081-49T but was detailed in the proposed recommendations. Both of these measurements of vulcanization behavior are suggested in addition to the measurement of modulus or strain of an ACS-I vulcanizate cured 40 minutes at 140° C.

Guayule Report Submitted

A report of the U. S. Department of Agriculture Guayule Experimental Station, Salinas, California, on the use of the two methods for dirt analysis developed by Subcommittee XII was submitted, together with a modified solution used by that organization.

It was voted that Subcommittee XII's two methods for the determination of dirt in crude natural rubber be submitted for letter ballot in both Subcommittee XII and Committee D-11; the adoption of the methods by D-11 is dependent on their acceptance in Subcommittee XII. The two methods are recommended for adoption as tentative standards. (The letter ballot was sent to members of Subcommittee XII by the chairman under the date of March 23, 1953, and was to be returned before April 27, 1953.)

It was the consensus that ASTM Designation D 297 was satisfactory for copper and manganese; however, the ashing step may be simplified.

It was reported that the British natural-rubber producing interests want to use modulus determinations on 10 and 40 minute cures at 140° C. of the ACS-I compound, and that they object to the great manpower and the number of Mooney viscometers required to use the scorch test and cure rate determination method, particularly for testing on the plantations in the Far East. Several members felt that the labor requirements for a modulus determination were greatly underestimated and those for a viscometer cure test overestimated.

The effect of moisture content on cure rate was discussed and it was decided that if the samples after milling were placed in a small air-tight container until tested, the effect of moisture on scorch time and cure rate would be at a minimum.

The subcommittee voted to instruct the American delegation to the June 1953 meeting of the ISO to present the view that technically classified rubber should have specifications for dirt, copper, and manganese, and rate of cure, and to recommend the procedures for dirt in crude natural rubber as published in ASTM Special Technical Publication No. 136, February, 1953, and the procedure in ASTM Designation D 297 for the determination of copper and manganese, with possible modification of the copper methods. The American delegation to the ISO meeting is also to present the views of Subcommittee XII on the measurement of vulcanization behavior of crude natural rubber, which includes the time of incipient cure and rate of cure, preferably determined by the change in Mooney viscosity of the ACS-I compound as a function of time at vulcanizing temperatures, for use in addition to the measurement of strain or modulus of the ACS-I vulcanizate cured 40 minutes at 140° C.

With reference to the forthcoming meeting of the ISO in Paris, Dr. R. G. Newton of the British Rubber Producers' Research Association has prepared a survey entitled "Historical Development of the Decision Concerning Time and Temperature of Vulcanization Used in the Routine Method for Classifying Raw Natural Rubber," which is to be submitted at that time. Copies of this survey can be secured from Mr. Bekkedahl.

World Rubber Acreage

According to the *Tea and Rubber Mail* of London, the world area under plantation rubber in 1951 was estimated at between 9,400,000 and 10,700,000 acres, the difference between the upper and lower limits being due to varying estimates of the acreage of small holdings in parts of Indonesia. Although more reliable figures are available for other major producers, those for a number of smaller countries are based on out-of-date estimates, and the total must be taken with reserve, the publication states. Comparison with a similar estimate for 1937, of from 8,400,000 to 9,900,000 acres, however, gives an indication of the extent to which the world acreage under rubber has increased in the intervening period—an increase attributable as much to the extension of acreage in a number of minor producing areas in Central and South America, and West and East Africa. The acreage under rubber in British Commonwealth countries is about one-half of the world total; of the Commonwealth total more than 70% is in Malaya, the publication stated.

New Liberia-Firestone Contract

His Excellency, Clarence L. Simpson, Liberian Ambassador at Washington, stated recently that the 99-Year Concession Agreement granted by his government to the Firestone Tire and Rubber Co. in 1926 has just been supplemented by a new contractual arrangement. "This new agreement which was not provided for in the original contract," the Ambassador declared, "is a most creditable action taken by farsighted management of this American enterprise in its dealings with my government." The Liberian government requested earlier this year that consideration be given by Firestone to the changed world rubber situation which caused the price of rubber to drop from 79 to 19c a pound in a few months. In the light of the extensive development program which has taken place in Liberia during recent years and which has made facilities and services available to offer considerable assistance to the operation of the Firestone plantations, the company in agreement with the government will pay income taxes at the rate of 25% instead of 14% for the next 11 years. Firestone officials said that their decision was also influenced by a desire to assist in making possible the continuation of the astounding progress the country has been making under the Tubman Administration.

Develops New Rubber Lubricant

A new liquid stainless, greaseless rubber lubricant, known as "Rub-Lub" has been developed by the Permatex Co., Brooklyn, N. Y. Packaged in two-ounce cans, with a triangle-shaped applicator, the new product quickly penetrates hard-to-reach rubber parts and surfaces in vehicle, refrigerator and other doors. It can be applied wherever rubber materials parts and surfaces need lubricating to prevent forming of hard surface "shells" and to stop grunts and groans and squeaks, the company claims.

CANADIAN NEWS

Five Canadian rubber companies accused of operating a combine in the restraint of trade, have pleaded guilty before a Canadian court. T. N. Phelan, Crown prosecutor, asked the court to impose the maximum penalty, $10,000 fine, and to issue an order for prohibition. The companies were Goodyear Tire & Rubber Co. of Canada, Dominion Rubber Co., Dunlop Tire & Rubber Goods Co., Gutta Percha & Rubber Co. Ltd., and B. F. Goodrich Rubber Co.

The five eliminated all competition among themselves, Mr. Phelan charged, and when tenders were submitted by public or private concerns they agreed among themselves and submitted identical tenders. The Crown said business done by the accused and co-conspirators between 1947 and 1952 amounted to $180,000,000.

Mr. Phelan produced a memorandum dated September 1947, written by O. H. Barrett, then assistant to the president, Goodyear Tire & Rubber Co., addressed to the then president, A. G. Partridge, and vice-president R. C. Berkinshaw. (Mr. Berkinshaw is president today). The memorandum discussed means of circumventing a government investigation of the combine, and suggested one scheme would be to destroy company files.

The files would show, the letter said, that: "Prices for all lines of mechanical rubber goods (except molded goods and a few special items) have been and are fixed from time to time by actual or tacit agreement". To destroy the files, the letter added, "would mean that the commissioner would have no documentary evidence available to his investigators. In this connection we are given to understand that the civil service departments are very short of accountants and similarly qualified people and the job may appear too large for him to tackle."

The memorandum also pointed out the difficulty of continuing the combine without files and added: "The destruction might also raise the inference in the minds of not only the investigators but reasonable men that we had acted as guilty rather than innocent persons and this might adversely influence the decision of a court." Mr. Phelan said the pecuniary penalty was limited to $10,000 against each accused, although an amendment since the charge was laid provides an unlimited fine at the court's discretion. Mr. Phelan explained this was not retroactive. The penalty provided for this case is "out of proportion to the offense," he held. He also asked for costs and the crown's expenses. So voluminous was the evidence, Crown council had two large filing cabinets brought into court to hold it.

J. J. Robinette, Q. C., representing Goodyear, led in the presentation of arguments by counsel of the five companies. The plea of guilty, Mr. Robinette said, was in no way a concession that any arrangement in the rubber industry constituted any evil from the public point of view. It was counsel who advised that a plea of guilty be entered because, he said, "the parties had apparently made an arrangement in violation of Section 498 which, as interpreted by the Supreme Court of Canada, precludes any inquiry by the court into the question whether the agreement or understanding in its actual operation had worked to the detriment of the public."

There has been no exploitation of the public, he said. This is demonstrated by the fact that the Canadian prices of several lines of industrial rubber goods are substantially below prices for similar goods in the United States. Similar arguments were presented by counsel acting for the other four companies.

The 36th Annual Conference of the Chemical Institute of Canada to be held in Windsor, Ont., on June 4, 5, and 6 is expected to bring about 1,000 delegates to Windsor in Canada's only national chemical meeting. Rubber chemists will be among those taking part in this Windsor Conference, and their 8-paper program has been announced by T. L. Davies, chairman of the Rubber Chemistry Division of the Institute. Mr. Davies, who is with Polymer Corp. in Sarnia, reports that the Rubber Chemistry Division's papers will deal with such subjects as: new products in rubber cements; man-made fibres; how rubber is used in automobiles; and new abrasion-resistant rubbers. The rubber speakers will come from the United Kingdom, and the United States, as well as from Canada.

A feature of the rubber program will be an address by one of the top technical men in the industry, S. M. Cadwell, who is director of development for the U. S. Rubber Co. Dr. Cadwell will talk about the future role of the chemist in the rubber industry.

Speaking on the impact of man-made textile fibres, will be J. W. Illingworth of Dunlop Tire and Rubber Goods, of Birmingham, England. Dr. Illingworth will point out how man-made fibers have almost completely replaced the natural fiber cotton in automobile tire casings, and are making inroads into the belting and other sections of the rubber industry. He will describe how high-tenacity viscose rayon is today the most important synthetic fibre for these uses, but other fibres such as nylon and Terylene are likely to become increasingly important. Dr. Illingworth will also mention the interesting development, taking place in several countries today, of using very high tenacity rayons that are considerably stronger than the standard industrial rayon yarns; these rayons will likely be of special interest in meeting the ever-increasing demands of the rubber industry.

Another speaker before the Rubber Chemistry Division's technical sessions will describe new types of rubbers that will outlast ordinary rubber by four or five times when used in tires; and these new rubbers should also prolong the life of shoe soles and heels, industrial belting, and rubber flooring tiles.

A fourth speaker will describe a new rubber-resin composition that has remarkable toughness and high impact strength; this product might have a big use in structural work, and in making chemical-resistant piping.

Other speakers will describe the super-abrasion carbon blacks that are now being made in a new plant in Sarnia for the first time in Canada; these blacks give to rubber compounds extremely high resistance to abrasive wear. Included in the program for the rubber chemists is a side-trip to Sarnia to visit the synthetic rubber plant of Polymer Corp. and the new furnace black plant of Cabot Carbon of Canada, the first carbon black manufacturer in Canada and just recently in production.

Record output and a 9% increase in net profit have been reported by the Goodyear Tire and Rubber Co. of Canada in the 1952 annual report. Net profit rose to $4,337,795, equal to $15.69 a common share, after preferred dividends, from $3,976,535, or $14.25 a share in 1951. Profit from operations was down to $9,581,940 from $11,-123,036 but lower depreciation charges and income taxes resulted in the moderate increase in net profit. Sales were substantially unchanged although export sales declined because of exchange and import restrictions, the report signed by P. W. Litchfield, chairman, and R. C. Berkinshaw, president, states.

Capital expenditures amounted to $2,044,-592 but the expansion program started in 1951 and involving the erection of new factory buildings at New Toronto was delayed by difficulties in procuring delivery of construction material. The plant is expected to be in operation by the end of 1953.

Working capital increased to $17,802,049 from $15,540,112 and the company had no bank indebtedness at the end of 1952 compared with a bank loan of $6,051,321 at the end of 1951. Inventories were down at $17,076,969 from $19,212,047.

Henry G. Harper was added to the board of directors. He is vice-president in charge of sales.

A majority of the common stock of the 111 year old McArthur Chemical Co., Ltd. of Montreal and Toronto, oldest chemical company in Canada, has been acquired by St. Maurice Chemicals Ltd. according to a joint announcement made by John P. Remensnyder, chairman of the board and V. G. Bartram, president of St. Maurice which is jointly owned by Heyden Chemical Corp. of New York and Shawinigan Chemicals, Ltd. of Montreal. Mr. Remensnyder is chairman of the board of Heyden Chemical Corp. and Mr. Bartram is president of Shawinigan Chemicals, Ltd.

Robert Berry, president of McArthur since 1947, will continue as president and the present organization will be retained, Mr. Remensnyder and Mr. Bartram said. A special meeting of stockholders has been called for April 16th. Founded in 1842, McArthur has long been internationally known as an importer and jobber of chemicals. The company has offices and warehouses in Montreal and Toronto and also maintains offices in Quebec City and Halifax. McArthur specializes in the resale of

organic and inorganic chemicals and related compounds important to textile, tanning, dyeing, laundry, dry cleaning and other Canadian industries.

The Fifth Canadian High Polymer Forum devoted to all aspects of High Polymer Chemistry will be held at London, Ont., November 19-20, 1953. There will be an invited address by a well known scientist in the field. Papers are invited for the general program. These may be unpublished discussions or reviews of timely topics or shorter original contributions. The papers may be released for publication in journals of the authors' choice upon request.

Authors of papers who attend the meeting may have their traveling expenses paid in part or in full by the National Research Council of Canada in certain cases. Applications should be made to the National Research Council for such a grant before the meeting.

Offers of contributions to the program should reach Dr. R. V. V. Nicholls, Department of Chemistry, McGill University, Montreal, P. Q. as soon as possible and a confirmation with a 200 word abstract not later than September 15, 1953. Information regarding rooms and other items of organization may be obtained from Dr. H. Leverne Williams, secretary-treasurer, High Polymer Forum, Polymer Corp. Ltd., Sarnia, Ont.

Barringham Rubber & Plastics, Ltd., has elected Arnold H. Smith, Leo E. Ryan and A. Monsaroff to the board of directors. They are president, executive vice-president and vice-president of Monsanto Canada, Ltd., Montreal, respectively. Other board members named are Felix N. Williams, a director and member of the executive committee of Monsanto Chemical Co., St. Louis, Mo., and Robert K. Mueller, general manager of Monsanto's Plastics Division, Springfield, Mass. New officers of Barringham are Mr. Ryan, president; Mr. Monsaroff, vice-president and J. Jekel, secretary-treasurer. Earl Moffat has been named general manager, and will be the operating head of the company.

The Chemical Division of the General Tire & Rubber Co. has announced the appointment of a new Canadian sales representative for eight of its products. R. M. Ferguson & Co., Toronto, Ont., will represent General Tire's Chemical Division in the sale of the following products: Gen-Tac Latex, Gen-Tac Resin, Ko-Blend IS, Kure-Blends, Kalabond, Actogen, Polystop A and K, Genpol Polyester Resins.

R. M. Ferguson, well-known to the Canadian rubber industry since establishing his own organization in 1948, formerly served as assistant to the general manager of the Chemical, Latex and Reclaim Division of Dominion Rubber Co., Ltd.

Firestone Tire & Rubber Co. of Canada, Ltd., has announced the appointment of Wm. E. Vaughan as Toronto District Manager. Joining Firestone in 1946, on his release from the RCAF, Mr. Vaughan was sales representative in the Belleville district for several years and then promoted to special truck tire representative. Two years later he took charge of Truck and Bus Tire Sales in Toronto. For the past two years he has been Maritime District Manager. Born in Toronto and a graduate of the University of Toronto, he now moves back to his native city as Toronto District Manager.

A new $1,500,000 boiler at Polymer Corporation's steam plant was started up recently. Steam output will be boosted to approximately 2,000,000 pounds an hour with the operation of the new boiler. It generates 440,000 pounds compared with 300,000 for each of the other five boilers.

Interesting Articles on Rubber

The current issue of *Rubber Developments*, published by the British Rubber Development Board, contains two interesting articles, one on "Conductive and Non-Static Rubber," and the other on "Multi-Braided Rubber Cord." The first article traces the development of conductive and non-static rubbers and offers information as to current uses. The second article deals with current experiments with braided rubber cord as a resilient base for upholstered furniture. The issue of the publication containing both articles is available from the Natural Rubber Bureau, 1631 K. St., N.W., Washington 6, D. C.

To Be General Cable Chairman

Irving T. Bennett, vice-president of Revere Copper & Brass, Inc., will assume the position of chairman of the board of the General Cable Corp., Rome, N. Y., on May 1, 1954, succeeding Dwight R. G. Palmer, who will retire at that time. Mr. Bennett was elected a member of the General Cable board of directors in April.

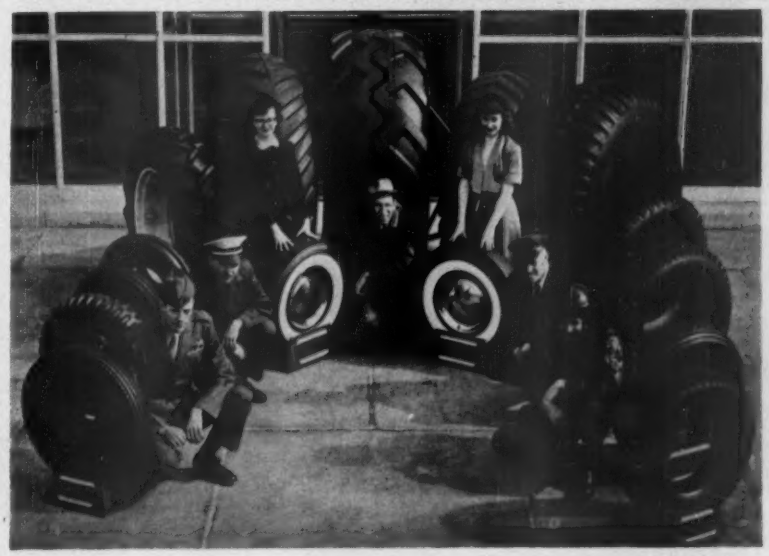
American Polymer Brazilian Plant

American Polymer Corp., Peabody, Mass., has announced the official opening of the plant of its Brazilian associated company, Polymer Products Quimicos do Brazil of Sao Paulo. The complete plant was designed and constructed by American Polymer in the United States and forwarded to Brazil last June through its Export Department, Chemicals Export Co. Polymer Products Quimicos do Brazil is said to be the first all purpose polymerization plant in South America to meet the needs for resin polymers for the leather, paint, plastic, textile, adhesive, and agricultural industry. Building construction and equipment installation were started in July, 1952 and actual production commenced on April 6, 1953. Dr. Ryan of American Polymer has been appointed general manager in charge of production for the Brazilian company. Dr. Ryan received his B.S. degree from the University of California, and M.S. and D.Sc. degrees from the Massachusetts Institute of Technology. Before joining American Polymer he was on the staff of the American Research and Development Corp. of Boston, Mass.

Named Goodyear-URW Umpire

James J. Healy, Harvard University professor and well-known labor arbitrator, has been retained as impartial umpire under the new contract signed by the Goodyear Tire & Rubber Co. and the United Rubber Workers, C.I.O. Mr. Healy was scheduled to begin hearing labor issues between the two parties on April 15. The new umpire was chosen by mutual agreement after the company and union representatives had considered a number of candidates.

FIRESTONE ANNOUNCES PRODUCTION OF COMPLETE LINE OF TUBELESS TIRES



A tubeless tire for every form of transportation became a reality recently with an announcement by the Firestone Tire & Rubber Co. of the development of tires without tubes for all types of vehicles including farm and giant earth moving equipment. The company states that as these tubeless tires replace tires with tubes, thousands of pounds of rubber will be conserved by the rubber industry. The picture above illustrates the wide range of Firestone tubeless tires.

LOS ANGELES NEWS

The Los Angeles Rubber Group held its April 8th meeting at the Hotel Statler in Los Angeles with approximately 140 members and guests in attendance. The technical session was addressed by Jack S. Buehler, chief chemist of the Midland Rubber Corp., who spoke on "Recent Developments in GR-S". The dinner meeting was sponsored by the B. F. Goodrich Co., and attracted approximately 260 members and guests. L. T. "Tom" Greiner of the sponsoring company spoke on "Forward Planning—Your Key to the Future."

The technical session of the May 12th meeting of the group was to have featured a panel discussion on "Maintenance of Rubber Machinery." The panel was to have included T. Cook (Goodrich), E. Davenport (Firestone), R. Holman (Voit Rubber), L. Kotich (Ohio Rubber), V. Nesche (Kirkhill Rubber), and M. Urich (Goodyear).

The Tire Division of the U. S. Rubber Co. has announced the appointment of B. S. Adams as factory manager of the Los Angeles plant succeeding G. R. Cuthbertson, who was recently promoted to assistant production manager of the Tire Division with headquarters in New York City. Starting as a "bead boy" twenty-seven years ago, Mr. Adams progressed

B. S. Adams

through jobs in the Product Control Department and as a supervisor, foreman and general foreman in the plant's Tire Building Division. He also spent three years during World War II as a superintendent at the Des Moines Ordnance Plant, operated by the company for the government during the war years. Prior to his present assignment, he was general foreman of the Tire Building and Curing Divisions at the Los Angeles plant.

Chester H. Leder has been assigned to the Los Angeles sales office of the Chemical Manufacturing Division of the M. W. Kellogg Co. He was formerly sales representative for Kel-F trifluorochloroethylene polymer, corrosion and heat resistant, dielectric materials used in the electrical, chemical and equipment industries at the company's Jersey City, N. J. office. Mr. Leder will handle sales of Kellogg's Kel-F brand polytrifluorochlorethylene molding powders, dispersions, oils, greases and waxes in the Pacific Coast area, from offices located at 609 South Grand Avenue, Los Angeles, Calif. Mr. Leder joined the Kellogg Company's Chemical Manufacturing Division in 1946. He attended Virginia Polytechnic Institute, where he received a B.S. in Chemical Engineering in 1944.

Pacific Moulded Products Co., 905 E. 59th St., Los Angeles 1, Calif., has completed extensive additions to its present plant. Having entered the field of silicones, the steady volume of increase in business necessitated a new 60 inch mill used exclusively for silicone rubber. In addition, a 2 inch and, a 3½ inch silicone extruder are also in operation. This also necessitated the addition of specially constructed curing ovens. The laboratory also grew to such proportions, it took over the executive and sales offices. In a further expansion, it was necessary to add another 2,000 square feet of building which will house the executive offices as well as engineering and sales offices.

The Flek Corp., 2252 E. 37th St., Los Angeles, Calif., has been appointed the exclusive warehousing distributor for Kel-F molding powders on the West Coast, by the M. W. Kellogg Co., Jersey City, N. J. All standard grades of Kel-F molding powders are stocked and are available immediately from the Flek Corp.

A full schedule of events has been planned for the Summer Outing of the Los Angeles Rubber Group which is to be held on June 6 and 7 at the Miramar Hotel in Santa Barbara, Calif. The golf tournament will be held on June 6 at the Monecito Country Club. L. E. Budnick (Ohio Rubber) is general chairman of the outing. Milt Churchill (Kirkhill Rubber) will be in charge of all games and outside activities, while B. R. Snyder (R. T. Vanderbilt) is in charge of entertainment. Charles Kuhn (Master Processing) is in charge of ticket sales.

Bond Adhesives in New Tube

Bond Adhesives Co., Brooklyn, N. Y., has announced the availability of several of their cements in a new type of collapsible tube. The tube comes provided with a needle-like tip about ¼-inch in length which closely resembles a hypodermic needle. Very thin lines of glue and tiny dots can be delivered without difficulty by the new tube. The new tubes are being used for Pliobond 20 and 30, and other nitrocellulose and polyvinyl acetate emulsion formulations.

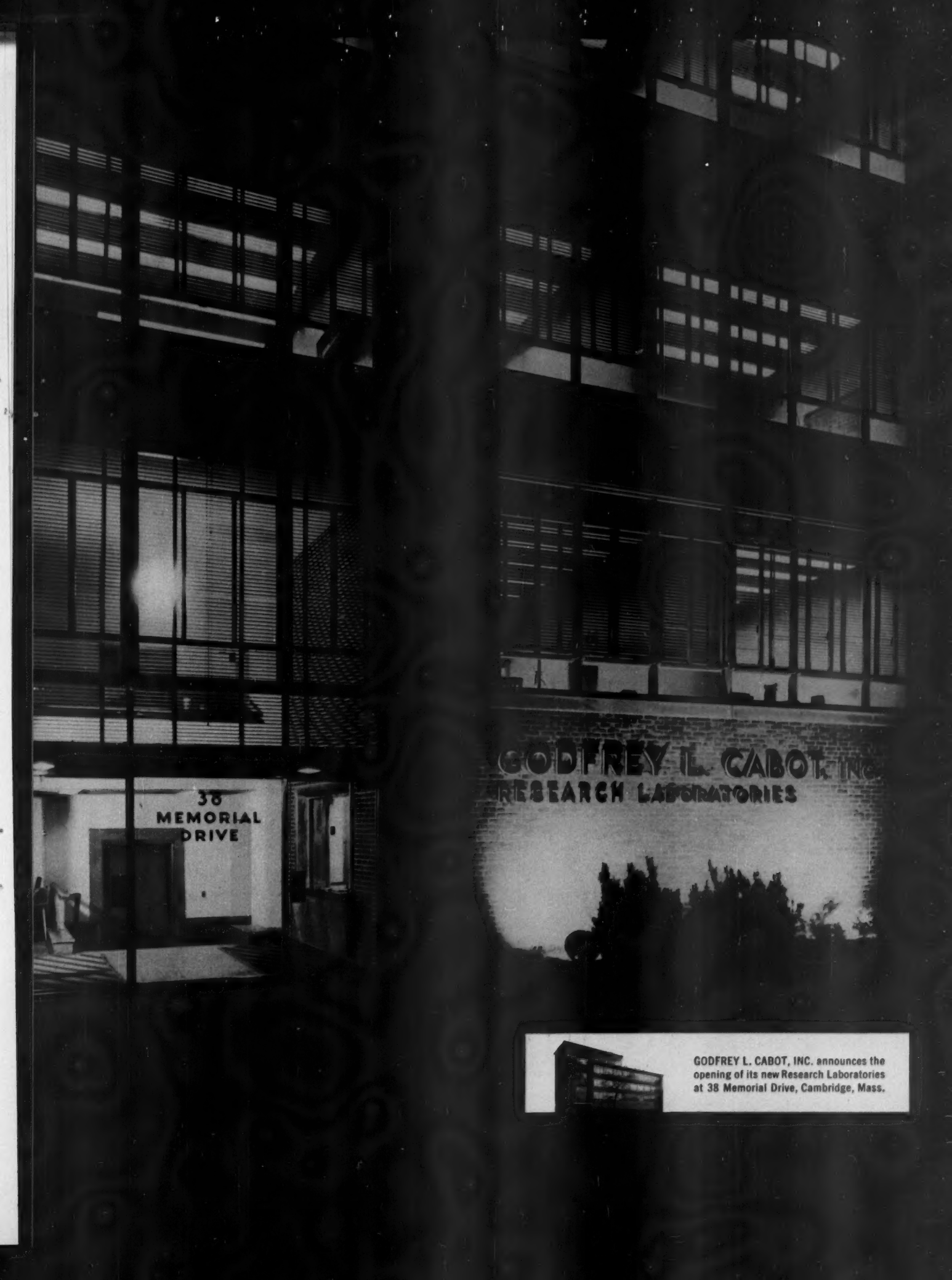
Named Coast Correspondent

Carl S. Hoglund

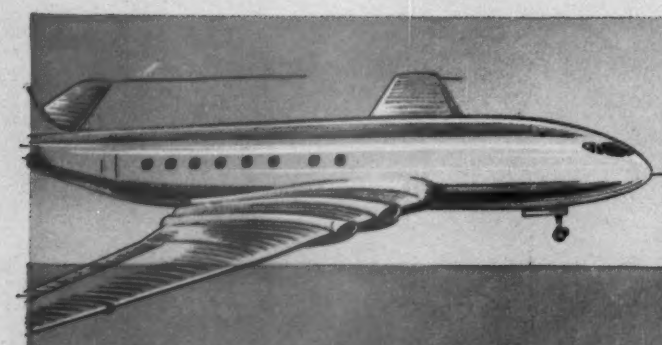
Carl S. Hoglund, technical sales representative of the R. D. Abbott Co., Los Angeles, Calif., has been named news correspondent for RUBBER AGE in the West Coast area. He succeeds George R. Steinbach, whose activities with the Merit Western Co. of Los Angeles precluded his activities with this journal. Mr. Hoglund has been associated with the R. D. Abbott Co. since February, 1951. Previously, he was associated with the Development Department of the Goodyear Tire & Rubber Co. Before entering the rubber industry, Mr. Hoglund was associated with the Legal Department of the New York Central Railroad, as well as the Mechanical and Operations Divisions. He attended Fenn College of Engineering where he majored in civil engineering, and later studied mechanical engineering and law at university extension courses in Eastern schools. Mr. Hoglund has long been active in affairs of the Los Angeles Rubber Group and is, at present, secretary of that group.

ASTM Plans 56th Meeting

The American Society for Testing Materials has announced its program for the 56th Annual Meeting to be held at Chalfonte-Haddon Hall, Atlantic City, N. J., from June 28 through July 3. Eight technical symposiums and many other technical papers on a wide range of subjects are planned. An important feature of the program will be the 27th Edgar Marburg Lecture on Wednesday afternoon, July 1, to be given by F. D. Rossini, director of the American Petroleum Institute Research Laboratory and head of the Department of Chemistry at the Carnegie Institute of Technology, who will discuss the subject "An Excursion in Petroleum Chemistry." Subcommittees of Committee D-11 on Rubber and Rubber-Like Materials will meet on July 1, 2, and 3, while the committee itself will hold a general meeting on July 3. Symposiums scheduled include: Metallic Materials at Low Temperatures; Fluorescent X-Ray Spectographic Analysis; Radioactivity in ASTM Work; Techniques for Electron Metallography; Significance of Tests of Concrete; Lateral Pile Load Tests; Porcelain Enamels and Ceramic Coatings as Engineering Materials; and Dynamic Testing of Soils.



GODFREY L. CABOT, INC. announces the opening of its new Research Laboratories at 38 Memorial Drive, Cambridge, Mass.



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Naugatuck Chemical Appointments

Donald E. Fowler, associated with the Naugatuck Chemical Division, U. S. Rubber Co., since 1938, has been named to the new post of assistant sales manager of the Latex and Aqueous Dispersions Group. The company also announced the appointment of Thomas D. Ramsey and Bradley A. Smith as technical sales representatives on the West Coast, Lawrence H. Bruce as technical sales representative in the New York area, and Arnold P. Paulk as technical service manager at the Los Angeles plant. Mr. Fowler was formerly manager of the Colloidal Products Research and Development Group. He holds degrees from the University of New Brunswick and McGill University, both in Canada. Mr. Ramsey joined Naugatuck Chemical in 1946. He is a graduate of the University of North Carolina, and was formerly production engineer at the Los Angeles plant of U. S. Rubber. Mr. Smith came to U. S. Rubber in 1951 from the Firestone Tire & Rubber Co. He is a graduate of the University of Michigan and also studied at Akron University and the University of California at Los Angeles. Mr. Bruce has been with Naugatuck Chemical for about ten years and is a graduate of Northwestern University. Mr. Paulk has been with Naugatuck Chemical for about eleven years. For the past nine years he has been concerned with latex and latex products. He is a graduate of Ohio University and Ohio State University.

Ruling on FTC Discount Ban Near

The Circuit Court of Appeals in Washington, D. C., is about to decide whether federal courts should review the Federal Trade Commission tire discount ruling. Major tire makers and dealers are arguing that if the tire discount rule is put into effect it will do them irreparable injury. Representatives of Montgomery Ward & Co. and of the American Oil Co., for example, told the court that their suppliers will cancel tire contracts if the FTC rule is upheld. Attorneys for Goodyear and Goodrich said that the large tire companies would lose their biggest customers if the FTC rule is allowed. The implication was that the big companies would lose business if they are no longer able to pass along special prices on large orders where mass production means lower costs. The FTC ruling has been set aside pending outcome of the case before the appeals court. The court will study the arguments and hand down a ruling. It may agree either that it is too early to review the FTC ruling or it may disagree. If the court disagrees, the case goes back to the lower court for hearing on the merits of the FTC rule.

RRI Publications of Interest

The Rubber Research Institute of Malaya has prepared a comprehensive leaflet listing all their publications of current interest, with revised prices. A copy of "Publications of the RRI" may be obtained free of charge by writing to the Director, Rubber Research Institute of Malaya, P. O. Box 150, Kuala Lumpur, Malaya.

Opens New Roll Covering Plant

Opening of a new, modern rubber roll covering plant for its subsidiary, the Manhattan Rubber Manufacturing Co. at Neenah, Wisc. has been announced by Raybestos-Manhattan, Inc., Passaic, N. J. The new plant expands existing facilities for rubber covering rolls for the paper and other industries in the Midwest. The new high single-story plant is laid out for straight-line production with a modern materials handling system and specially built machinery to handle the largest size rolls. Rolls come directly into the bay area of the plant where they are picked up by overhead cranes on which they can be transported in full length of the plant for straight-line production. Rolls are carried by cranes to cut-off lathes for removing old covering and preparing metal surfaces. All rolls are then precision checked for correct balance, and then go to the covering section. Rolls then move on cross-shop transfer tracks into vulcanizers equipped with precision temperature and time controls to assure correct curing and accurate density. Grinders handle all roll sizes including the largest rubber covered rolls in use today. After grinding and crowning, rolls are again precision checked for density, dimensions, and static balance, and where requested they may be dynamically balanced at required operating speeds.

DuPont Trial Ending in Sight

Defense and government attorneys in the E. I. du Pont de Nemours & Co. anti-trust trial presently being held in Chicago, Ill., have disclosed plans to wind up presentation of evidence by early July and to present arguments in the fall. The court has scheduled a recess for a ten week summer vacation beginning July 8. Earlier, DuPont attorneys submitted exhibits which they said showed that the company was doing business with General Motors long before it bought stock in that concern. M. N. Nickowitz, assistant manager and director of sales for the DuPont Fabrics Division, told of his firm's supplying the automobile industry in the first part of the century. Records dated July 31, 1913, the defense declared, showed the DuPont Fabrikoid Co. was selling its wares to several divisions of General Motors as well as to other automobile manufacturers. Mr. Nickowitz said that DuPont had acquired part of Fabrikoid in 1910 and by 1915 DuPont was supplying 40% of the motor industry's requirements for fabrics. By 1916, he said, that percentage had risen to 60. It was not until 1919, however, that DuPont acquired a stock interest in General Motors. The government suit seeks to force DuPont to divest itself of its interest in General Motors.

Paulus Buys Auburn Plant

Paulus, Inc., Pittsburgh, Penna., has acquired and placed in operation the building and manufacturing facilities of the Connellsville, Penna., plant of the Auburn Rubber Co. The 40,000-square foot plant will manufacture the entire line of Paulus, Inc., products, including various mechanical rubber goods and plastic pigment for the paint industry.

Floor Tile for Hospital Safety

The danger of explosion in a hospital operating room caused by sparks is said to be reduced by properly installed new type floor tile made with Vinylite resins by Vinyl Plastics, Inc., Sheboygan, Wisc. Long-wearing and easy to maintain, Vinylite plastic tile is resistant to most chemicals found in an operating room. Installed according to the manufacturer's instructions, the new flooring dissipates electrostatic charges on persons and conductive equipment contacting the floor. The tile meets the National Fire Protection Association's requirements as to minimum as well as maximum conductivity. Designed especially for operating room floors the tile resists indentation from heavy equipment. Easily installed, the tile can be laid over existing flooring in good condition. An entire operating room floor can be laid rapidly without serious interruption of surgical schedules, according to the manufacturer. Marbleized with green and white, the jet black, 9 by 9-inch tile are one-eighth of an inch thick, the same durable Vinylite plastic compound throughout. Because of this construction, the appearance and electrical properties of the tile remain the same throughout its life. The tile's resilience and sound-absorbing qualities increase foot ease and working comfort. The non-porous flooring keeps dirt on the surface where it can be removed with soap and water. A dry mop removes most footprints.

Goodyear Promotes Warner and Kann

Announcement has been made of two promotions in the Chemical Division of the Goodyear Tire and Rubber Co. John E. Warner has been appointed district manager of the Chemical Division's St. Louis office and Robert E. Kann has been made district manager for the Chicago area. Mr. Warner, who served in the navy from 1943 to 1946, first joined Goodyear on the production squadron. He later became a sales trainee specializing in paints in the Chemical Division, and in 1950 he was appointed special representative to the Chicago district. He held this position until becoming district manager in St. Louis. Mr. Warner was born in Warren, Ohio and attended Kent State University. A native of Minot, North Dakota, Robert Kann became associated with Goodyear in 1951 as special representative in the Chemical Division's midwest district office in Chicago. Mr. Kann has had wide experience in the rubber industry and is a graduate of North Dakota State University. He also served in the navy from 1945 to 1946.

Plans $4,000,000 Debenture Sale

The Armstrong Rubber Co. of West Haven, Conn. has announced plans to raise some working capital by selling $4,000,000 of debentures. The securities, due May 1, 1973, will be offered for public sale by a group of underwriters headed by Reynolds & Co., according to a registration statement filed with the Securities and Exchange Commission. Proceeds from the debenture distribution together with about $3,000,000 to be borrowed from insurance companies, will be used as working capital.

OBITUARIES

Clifton G. Cashion

Clifton G. Cashion, technical sales representative for the Xylos Rubber Co., division of the Firestone Tire & Rubber Co., died suddenly on April 9 at City Hospital in Akron, Ohio. Although he had been ill for several months, he had been recuperating at home. Suddenly, however, he was stricken with a heart attack and rushed to the hospital where he passed away. Born in Indianapolis, Ind., on January 17, 1905, Mr. Cashion attended Akron University. He then joined the Philadelphia Rubber Division of the B. F. Goodrich Co. at Akron as chemist. Later, he joined the R & H Rubber Co. in Los Angeles, Calif., as chief chemist. He returned to Akron in July, 1933, and joined the Firestone organization. Mr. Cashion was active on the SAE-ASTM Committee on Automotive Rubber and also served on other ASTM committees. He was a member of the American Chemical Society and the Akron and Detroit Rubber Groups. Mr. Cashion was a Mason. Funeral services were held on April 13 in Akron with interment in Rose Hill Cemetery in that city.

David A. Shirk

David A. Shirk, founder and president of the Rare Metal Products Co., Atglen, Penna., died on March 11 at his home in Lancaster, Penna. He was 60 years old. Born in Lancaster, Mr. Shirk attended the Carnegie Institute of Technology and Cornell University. Later, he became associated with Dr. Ralph E. Myers in the manufacture of antimony sulfide in Glen Ridge, N. J., and in 1915 they formed the Rare Metal Products Co. In 1917, the company transferred its operations to Belleville, N. J., where it continued to operate until 1946 when it moved to its present location in Atglen, Penna. Although Mr. Shirk had been confined to his bed for the past five years with a back injury, he continued to be active in the affairs of the company until his death. He had been a member of the American Chemical Society since 1926, and had been a member of the 25 Year Club of the New York Rubber Group. He is survived by two daughters.

Hugh M. Smallwood

Dr. Hugh M. Smallwood, physical chemist at the general laboratories of the U. S. Rubber Co. at Passaic, N. J., died on April 27 after a short illness. A department head at the Passaic laboratories since 1945, he had been in charge of analytical reesarch since June, 1952, and specialized in statistical research methods and quality control. A graduate of Johns Hopkins University, he taught at that school and at Harvard University before joining U. S. Rubber. He was a member of several technical societies. Funeral services were held on April 29 in New York City.

John A. Johnson

John A. Johnson, for many years factory manager of the Hodgman Rubber Co., Framingham, Mass., died on March 27 after a brief illness. He was 66 years old. Prior to the first World War, in which he suffered severe gas inhalation injuries, Mr. Johnson was connected with the Plymouth Rubber Co. of Canton, Mass. After his return from service, he joined Hodgman Rubber as factory superintendent. In 1939, recurring illness due to his war injuries necessitated surgery. These same injuries were instrumental, when he recently contracted pneumonia, in causing his death. Funeral services were conducted from his home in Wellesley Hills, Mass., with interment in Evergreen Cemetery, Brighton, Mass.

John J. Moriarity

John J. Moriarity, widely known rubber chemist, passed away on March 30 in Mercy Hospital, Springfield, Mass., where he had been a patient for more than a year. Born on December 20, 1876, in Toronto, Ont., Canada, Mr. Moriarity had a long career in the rubber industry. He was associated with the B. F. Goodrich Rubber Co., Goodyear Tire & Rubber Co., and the Firestone Tire & Rubber Co. He also served as manager of the Victor Rubber Co. While associated with the Pennsylvania Rubber Co. of Jeannette, Penna., he invented and patented the Pennsylvania "Vacuum Cup" tire, said to have been the first successful non-skid tire of its kind. Mr. Moriarity is survived by his wife and two daughters.

William B. Rogers, III

William B. Rogers, III, technical sales representative for Angier Products, Inc., Cambridge, Mass., died on April 5 in Boston, Mass., after a short illness. He was 27 years old. Mr. Rogers had been active in promotion of new products for the many industries using adhesives. Prior to joining Angier Products, Mr. Rogers served in the U. S. Navy. He leaves his wife and three sons.

David M. Rapport

David M. Rapport, president of the Rapid Roller Co., Chicago, Ill., died recently in Los Angeles, Calif. He was 68 years old. A graduate of Lewis Institute, he invented the first lithographic roller. In 1917, he organized his company and was instrumental in the development of the lithographic blanket used in printing.

The Plastic Products Division of B. F. Goodrich has acquired Walter W. Metzger, Inc., distributor of Koroseal upholstery material to the transportation industry. The firm is located in Detroit.

NBS Develops Osmometer

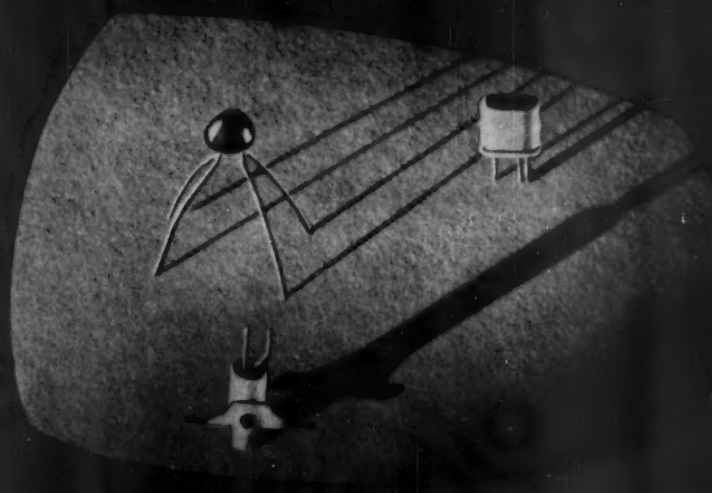
To replace tediously assembled and easily chipped glass osmometers, G. A. Hanks and S. G. Weissberg of the Polymer Structure Laboratory of the National Bureau of Standards have developed a simple, rugged osmometer, largely of metal construction, which has several significant advantages over other instruments of this type. The new NBS design permits the instrument to be assembled, rinsed, and filled conveniently while keeping the membrane wet with solvent at all times. The solution cell holds less than 2 ml so that a relatively small quantity of polymer suffices for a complete osmotic pressure curve. The heart of the NBS osmometer, a nickel-plated brass cell contains the polymer solution of which the osmotic pressure is to be measured. A vertical glass capillary of 0.5 mm bore is inserted in the top of the cell, and a semipermeable membrane is stretched horizontally across an opening in the bottom of the cell. The cell, membrane, and lower portion of the capillary are immersed in the solvent or the polymer solution. The liquid level in the capillary, showing the rise of the polymer solution due to osmotic pressure, is compared with the level of the pure solvent in a reference capillary attached to the measuring capillary by either a metal or a glass bridge.

New Type Shoes Feature Vinyls

Three new products—a non-wrinkling, more flexible insole; a high tear-resistant "base"; and a special hot melt adhesive for tuck cementing on California type shoes —are now in production by the Shoe Products Division of the Dewey and Almy Chemical Co. The new insole is said to provide faster "grab" in cementing, increased cross-wise rigidity to prevent wrinkling and improved flexibility. It is also designed to hold the style and original lines of the shoe, provide good rounding and a cushion for the foot. The new high tear-resistant base called "No-Tear," is a wet laid felt which when coated with pyroxalin or vinyl, is used for sock linings and heel pads. It is also used as a plumper to combine with fabric and plastic film. The new Darex R-8 hot melt adhesive is used for shank cementing and California shoe tucks. It provides a tough flexible bond, sticks quickly to a wide variety of materials and offers a high yield of 450-500 tucks per pound in California shoes. It contains no water or solvents to evaporate, and no rosin pitches or asphalt to cause brittleness, the company states.

Neoprene Prices Adjusted

The Rubber Chemicals Division of the Organic Chemicals Department, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., has raised the price of some of its dry types of neoprene from 1 to 5c. Types AC and CG, for example, now sell for 55c a pound in 50-pound bags. Three types, KNR, Q and WRT were unchanged in price. Prices for neoprene latices have also been revised upward by 2 to 4c. Neoprene Latex 735, however, was unchanged in price.



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- FACTORY SCRAP—Bought & Sold—uncured compounds, scorched stocks, friction scrap, everything.
- HARD RUBBER DUST—all qualities to your specifications.
- SCRAP RUBBER—All Types—sorted, packed and shipped with rigid observance to prevailing specifications.

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- **We will buy or sell your Polyethylene, Polystyrene, Vinyl, and Acetate scrap or surplus.**
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NEW GOODS

Rubber Traffic Guard Posts

Rubber guard posts built by the Goodyear Tire and Rubber Co., are being tested at a dangerous traffic intersection in suburban Cuyahoga Falls, Ohio. The rubber posts have replaced rigid steel posts which were removed after the third of a series of fatal automobile accidents at the intersection in recent years. Engineers hope that when a car hits the rubber posts they will bend enough to allow the vehicle to ride up over them, or slow the vehicle sufficiently to prevent serious injury to the driver. Made of a very high tensile compound, the rubber posts are similar in design and construction to the

Goodyear-built rubber dock fenders installed in New York harbor to protect both ship and pier and to aid in docking the high-speed ocean liner, United States. In the traffic guard post project, the hollow tubes are cut to five-foot lengths which slip over 18-inch long steel tubes imbedded in a concrete base. The steel core extends only a few inches above ground, so that the rubber tubing takes the full impact in case of a car or truck collision. Engineers believe that the posts will prove sufficiently strong to withstand such collision, yet flexible enough to give under the shock and thus prevent serious injury to the driver.

STATEX 125

No matter how you look at it...

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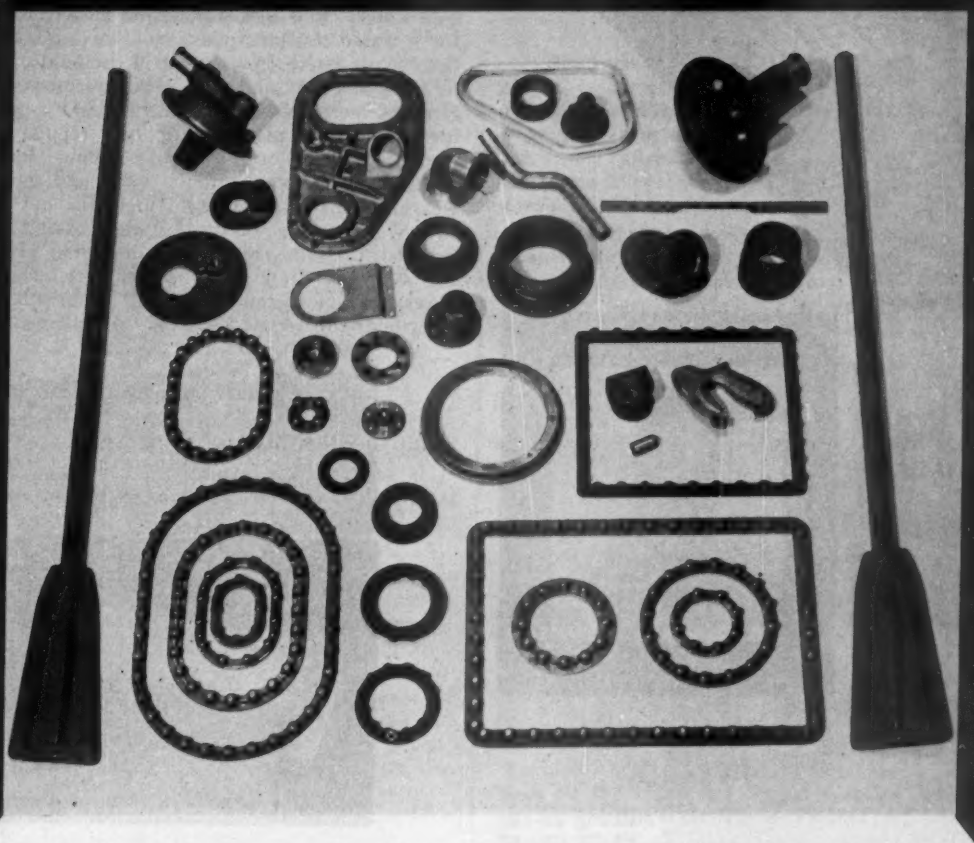

Introducing just a few of the Production Parts we are making for our customers. Our facilities provide the Pressure-Casting, Forming, and Fabricating of Parts from Aluminum Alloys. We have the production tools to do any of the secondary operations on Parts to your specifications. In addition, we assemble, by casting many small parts into one finished product.

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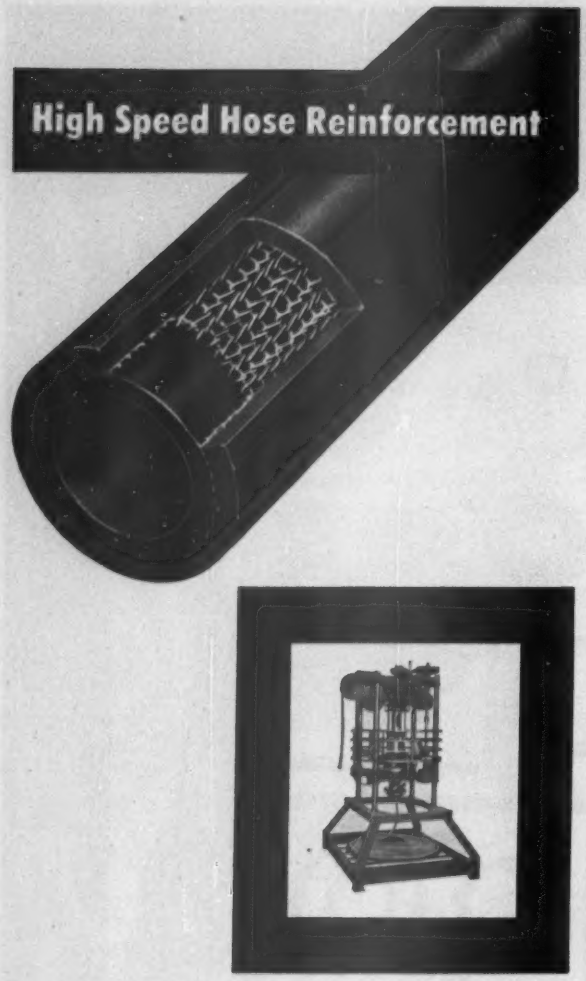
Makers of Production Parts and Fittings, such as —

Cover Plates, Inner Connectors, Inner Supports, Collars, Cores, Gauges, Transfer Tubes, Tool Handles, Oars, Hand-Hole, Filler-Neck, Nut Flanges, Sump Fittings and many other Items in the Interest of National Defense.

FORMS	MOLDS	DIES	MACHINERY
LATEX - DIPPING	STEEL AND ALUMINUM	PLASTIC - INJECTION	SPECIAL - AUTOMATIC



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HOSE REINFORCEMENT MACHINE—utilizing an improved method of knit reinforcement—gives hose extreme flexibility, consistent diameters, and greater adhesion. Fidelity Hose Reinforcement Machines automatically controlled with electric stop motions are readily adaptable to a wide variety of applications.

Write today for Catalog HR describing cost saving and technical details. When in the Philadelphia area visit the new show rooms in our plant and see the Hose Reinforcement Machine in operation.

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Porolated Vinylfilm

Porolated Vinylfilm, a new vinyl plastic that is "rain-proof", yet breathes by allowing a high rate of air transmission, has been developed by the Goodyear Tire & Rubber Co. The company said the new vinyl fabric holds many advantages over ordinary plastic films because it is vented to allow permeation of air, yet will hold water. It is the long desired answer to fabricators for a water resistant plastic film of high permeability. Goodyear's latest achievement in the field of vinyl plastic films has thousands of vents per square foot. This gives the material approximately a 700% greater moisture-vapor transmission rate than regular vinyl film. Porolated Vinylfilm is especially suitable for the manufacture of rainwear, infants' wear and other items of wearing apparel along with mattress and pillow case covers, slip covers for furniture and chair pads and garment bags. Rainwear made of Porolated Vinylfilm gives the wearer a "rain-proof" garment which greatly reduces discomfort caused by lack of breathing qualities in ordinary materials, the company claims.

All-Rubber Blackboard Eraser

A new all-rubber blackboard eraser has been introduced by the Nuline Products Co., Long Beach, Calif. It is noiseless, washable and dustless. The company claims that rubbing the unit on a blackboard creates

static electricity charging the cellular rubber portion of the eraser. This causes the eraser to suck up all the chalk dust. The top of the eraser is firm, while the base is of foam rubber.

Mobile Dock Barges

Rubber components for the gigantic new mobile dock barges being used by the Army are being manufactured at the Akron plant of the General Tire & Rubber Co. Originally designed and built by DeLong Engineering & Construction Co. as off-shore drilling units, the installations have been accepted by the Army as mobile dock barges. These double-duty barges can be towed anywhere in the world with cargo and then converted into a dock. Later, they can be returned to barge status and floated to another location. General Tire's rubber parts for the dock barge include huge "grippers" and "flat bags" for installation in the pneumatic jack which permits the lowering and raising of the barge platform. Through the flexible action of these rubber components, the air jacks surrounding the caissons work like a schoolboy "shinnying" a flag pole as they either raise or lower the platform of the dock barge.

Walkie-Talkie Battery Vest

The U. S. Army Signal Corps is experimenting with a way to keep front-line walkie-talkie batteries warm and functioning normally in sub-zero temperature. A new, flexible vest, made with 117 pockets to hold as many dry cells has been designed for wear under the overcoats of foot soldiers assigned to frontline radio communications. Dry cells kept warm in this fashion have many times as much energy as regular batteries, which when exposed to freezing cold, are quickly sapped of energy. The flexible, shaped-to-body, battery vest was developed by the Signal Corps Engineering Laboratories at Fort

Monmouth, N. J. and made by the B. F. Goodrich Co. It weighs slightly more than three pounds but uses little heat from the soldier's body. According to the company, the dry cells are about the size of a small pencil stub and are interconnected by a network of extremely flexible wires to form the equivalent of the conventional battery. The battery vest furnishes power to operate both radio transmitter and receiver and is interchangeable with the standard battery for the battlefront walkie-talkie when used in temperate climates. Rubber used in the vest is a special synthetic that permits the battery to breathe, yet does not dry it out.

Made for You!

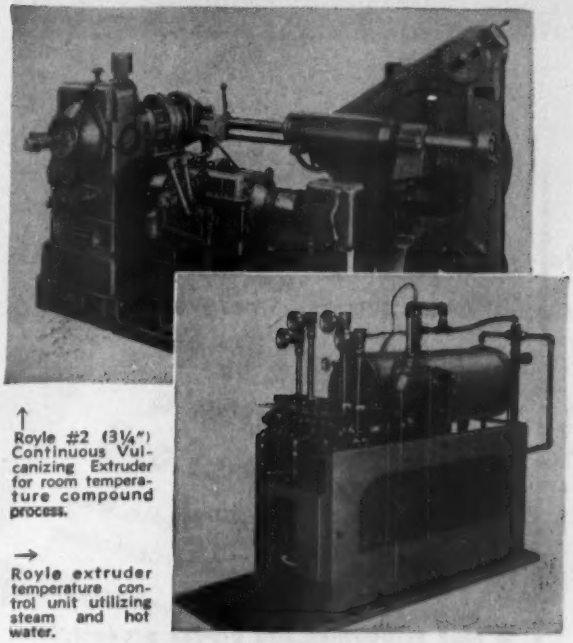
SEE PAGE 158

Of Particular Importance

To the Wire Insulating Industry

The room temperature compound process and associated equipment recently developed by the Western Electric Company, Incorporated, offer nine important advantages. These advantages begin with the storage of completely mixed, ready-to-extrude, rubber, GR-S, or Neoprene compounds and extend to a smoother and improved appearance for the finished product.

The complete extruder vulcanizing portion of the room temperature compound process is available to insulated wire producers* from John Royle and Sons who, for seventy-two years, have been building extruding machines to meet the most exacting process requirements.



↑ Royle #2 (3¼") Continuous Vulcanizing Extruder for room temperature compound process.

→ Royle extruder temperature control unit utilizing steam and hot water.

CHECK THESE ADVANTAGES:

- Improved diameter control
- Reduction in compound scrap
- Reduction in electrical faults
- Permits storage of completely mixed compounds
- Permits more economical scheduling of mixing equipment
- Eliminates "warm-up" operation
- Possible mill-room economies
- "Hot" machines may be converted
- Finished product has smoother finish—better appearance

**Licensees of Western Electric Company*

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Types, grades and blends
for every purpose, wherever
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can be used in production
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be they Synthetic, Natural,
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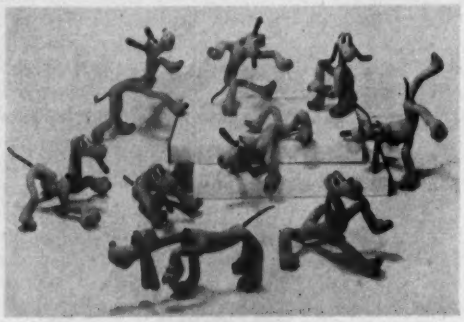
Akron, Boston, Trenton, Chicago, Denver, Los Angeles

New Bayshore Foam Toy

Bayshore Industries, Elkton, Md., has introduced a new foam rubber toy, "Pluto the Pup," patterned after the famous Walt Disney character. Attractively colored, Pluto is wired so that he can be bent into any position.



The photograph above shows only some of the positions the new toy can take. Pluto can be secured with his own dog house, further adding to his play value. The company states that Pluto is but one of a proposed group of this type of toy.

Mesh Marked Golf Ball

U. S. Rubber Co. has introduced a new mesh marked golf ball as an addition to its 1953 golf ball line. Each mesh marked golf ball is covered with an electronically sealed plastic covering that protects it until it is played. In introducing the mesh marked golf ball, the company revives a distinctive cover marking that was a favorite among golfers 25 years ago. The 1953 mesh marked ball has modern improvements of a silicone center and electronic winding, to give long, true flight and uniform performance. It has a tough, fully cured Cadwell cover that is highly resistant to cutting and scuffing. It is improved with modern painting so it looks and stays whiter, the company states. The 1953 mesh marked golf ball is a legal tournament ball that meets all required specifications of the United States Golf Association. It is 1.68 inches in diameter and weighs 1.62 ounces. It is being presented in the U. S. Royal Special, the U. S. Royal (Blue) and the U. S. True Blue brands.

STATEX
125

rolls
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rubber.. tile.. plastics... paint.. linoleum
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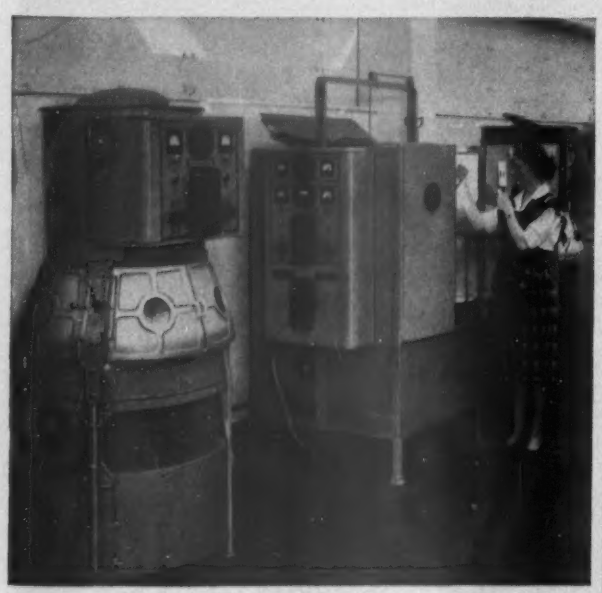
ATLAS-OMETERS

. . . used in Quality Control for plastic or rubber products at B. F. Goodrich Company



An important part of the tests at B. F. Goodrich Company Laboratories involves subjecting products to the destructive effects of weathering conditions they will be expected to meet in service. By using Atlas Fade-Ometers and Weather-Ometers it is often possible to obtain quickly, in advance of actual service, assurance that new materials will have satisfactory resistance to cracking, sun-checking, chalking, fading or bleeding of color, or to loss of elastic properties.

In the Fade-Ometer—used to check the reaction of any material or type of finish to the deteriorating effects of sunlight—plastic materials such as Koroseal are tested for permanence of bright color. The Weather-Ometer —which accurately duplicates rain, heavy dew, sunlight and thermal shock—offers complete control of these elements so that any desired climatic cycle can be obtained. Results of tests in the Weather-Ometer are used in the evaluation of the aging and weathering characteristics of rubbers and plastics under accelerated conditions corresponding to outdoor exposure.

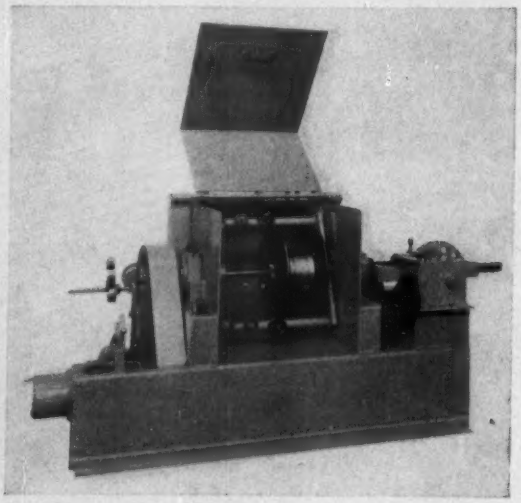
The machines are easy to operate, fully automatic, and may safely be left in continuous operation overnight without attention from the operator.

ATLAS ELECTRIC DEVICES CO.
361 West Superior St., Chicago 10, Illinois
WEATHER-OMETERS • FADE-OMETERS • LAUNDER-OMETERS

NEW EQUIPMENT

Cook High Speed Buncher

Ideally suited to the extruding field where a concentric buncher is a necessity, the Cook Buncher, produced by the Cook Manufacturing Co., 265 North Ninth Street, Paterson, N. J., has successfully stranded 7, 10, 16, 19, 41, and 65 lines with such concentricity that its passage through an extruding die of only 1 mil clearance was not impeded. The Cook Buncher is built entirely of heavy steel plate and is of welded construction



throughout. The flyer is of sturdy construction and properly balanced to insure quiet operation free from vibration. The traverse mechanism is operated by worm gear drives completely enclosed in an oil seal housing. Standard ball bearings are used throughout the machine. The unit is powered with a 5 hp automatic brake motor with magnetic starter. An open door safety switch is provided together with a low voltage automatic shut off that operates when the feed lines break, sag or when the feed reel empties. All controls are mounted for convenience and ease of operation.

STATEX 125

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CHEMICAL PRODUCTS

for

LOW COST NEOPRENE COMPOUNDS

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INDONEX with NEOPRENE type WHV

High compatibility and non-volatility of INDONEX Plasticizers give outstanding properties before and after aging. For low cost 70-80 hardness compounds, 100 parts Neoprene Type WHV, 250 parts carbon blacks, 75-100 parts "INDONEX." Excellent lower hardness compounds by additional compounding. See Circular 13-47.

Send for:
Circular 13-47 and
General Bulletin 13

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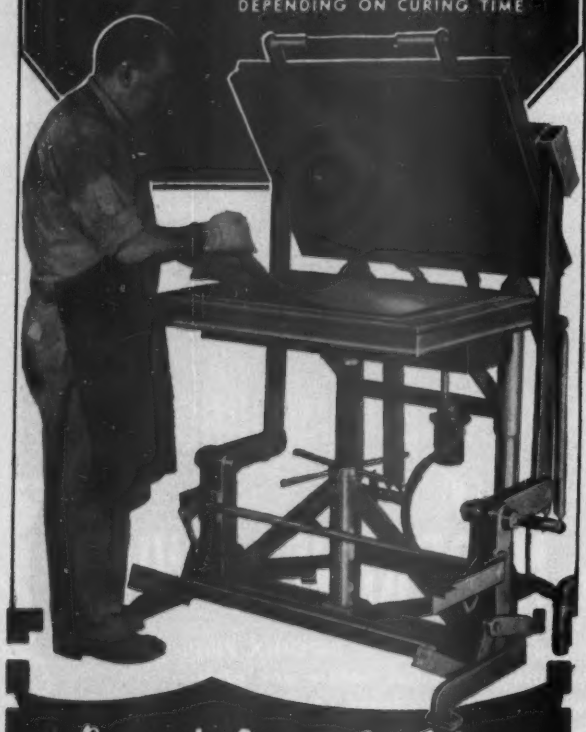
ONE MAN CAN OPERATE
FROM 1 TO 17 . . .

Holmes

SPONGE RUBBER
VULCANIZING PRESSES

. . . Simultaneously
DEPENDING ON CURING TIME



Original Cost . . . 80% Less

With The HOLMES SPONGE RUBBER VULCANIZING PRESS--there's no effort, no exertion, no operator fatigue. Mold remains set --no need to separately lift it each time. Locking and release is accomplished by simple foot action. Thus one man can operate from 1 to 17 at a time. Costs 1/5 of any other press that will do the same work.

WRITE OR WIRE FOR SPECIFIC DETAILS--regardless of your particular requirements. With 52 years know-how specializing in machinery and molds for the rubber industry--Holmes can help you solve your problems, too, just as they have for so many others. No obligation, of course.

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Stanley H. Company

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Wallace Hardness Tester

Said to be the first bench-type precision instrument built to make rubber hardness measurements in familiar units to laboratory standards of accuracy, the Wallace Dead-Load Hardness Tester, produced by H. W. Wallace & Co., Ltd., Croydon, Surrey, England, gives readings in British Standard Degrees, which, for all practical purposes, is the same as the Durometer "A" scale. The load is applied to the indentor by means of weights instead of a spring which immediately removes one source of error, the manufacturer states. Readings are taken from a sensitive dial guage of standard design with a specially printed scale. An electric vibrator is built into the base of the instrument to prevent friction

STATEX 125

Just Out!

Witco's new booklet on Fast Extrusion Furnace Blacks

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Comparison charts on performance of WITCO FEF Blacks and competitive FEF Blacks in: natural rubber . . . regular GR-S . . . low temperature GR-S . . . butyl . . . hycar . . . neoprene type GN . . . neoprene type W. A valuable addition to your rubber library.

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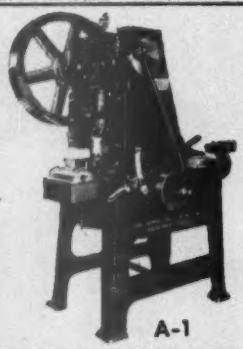
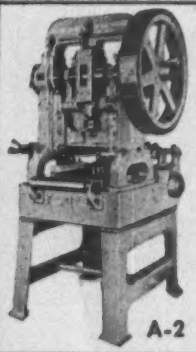


A-1

MODEL A-1

Cutting Heels at high speed production or short runs.



A-2

MODEL A-2

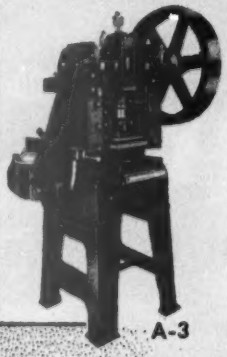
Cutting Multiple Heels, Half and Full Soles with stock grain.

MODEL A-2s

(Not illustrated)
Cutting across grain of stock.

MODEL A-3

Cutting Multiple Heels and Taps with or across stock grain.



A-3

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coulter production machines

HAVE MEANT MORE IN HIGHER QUALITY CUTTINGS . . . MORE IN GREATER PRODUCTION.

the James COULTER Machine Co.

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and sticking. The unit conforms to the new method of test recommended by the International Standards Organization. The test is based on a measurement of the penetration of a spherical indentor into a test piece under specified conditions of loading.

The instrument reads in the I.S.O. Hardness Scale, and it is said that one degree on this scale can be proved mathematically to represent approximately the same proportionate difference in Youngs' modulus for substantially elastic isotropic materials as well as vulcanized rubbers. The manufacturer also states that it has been possible to relate readings from this test to the Shore Scale in such a manner that between readings of 30 and 100 the new I.S.O. Hardness Scale and the Shore "A" Scale are for all practical purposes identical.

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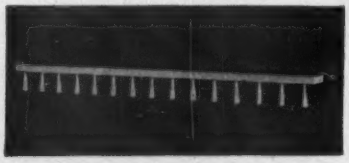

the machine frame may be made in any convenient manner with strap metal, brackets, angle or channel irons. It requires no external source of power thereby eliminating high voltage transformers, high tension cables and fittings which may fail in service. Static electricity is said to be efficiently neutralized no matter how high the voltage of electrified stock or how fast the processing speed of such stock.

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SEE PAGE 158

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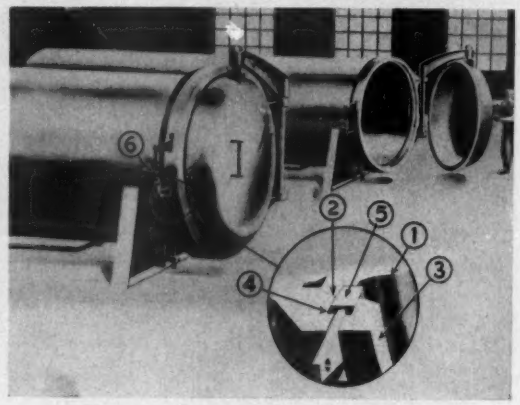

use of the new type door, one manufacturer in the rubber industry cut the time required for opening or closing the doors on vulcanizers from 20 minutes to 30 seconds. On short time industrial processes, such time savings greatly boost production. In addition to being used on rubber vulcanizers and reclaiming equipment, the newly perfected door is being used in varied other industries. Quick opening doors have been built to withstand temperatures to 400° F. and pressures to 300 pounds per square inch.

The operating principle of the Blaw-Knox quick-opening door is very simple. The drawing above illustrates how it works. The door (1) fits into an opening in the doorframe in such a way that a bevel on the door meets a bevel on the inner surface (2) of the doorframe. A flange (3) surrounds the doorframe. In this flange is an annular groove (4) in which a split ring (5) floats. The door is quickly opened or closed merely by expanding or contracting this split ring by means of a hand-operated jack (6) or a hydraulic cylinder.

STATEX 125

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REVIEWS

BOOKS

History of the Rubber Industry. Edited by P. Schidrowitz and T. R. Dawson. Published by the Institution of the Rubber Industry, 12 Whitehall, London S.W. 1, England. 6 x 8¼ in. 406 pp. 30s (approximately $4.20).

Although the technical literature on rubber has reached imposing proportions, very few books on its history are available. The first attempt at such a history was "Rubber: A Story of Glory and Greed," written by Howard and Ralph Wolf and published in 1936. That there was both need and demand for a book of this nature was proved by the sales figures on the book. The current work, compiled under the auspices of the Institution of the Rubber Industry, representing the work of 35 separate authors, is a comprehensive account of the industry's development, and fills in some of the gaps left in the previous work.

The book has 35 chapters grouped into six sections, as follows: (1) Origin of the Industry; (2) Raw Materials of the Industry; (3) Scientific and Technological Development; (4) Products of the Industry; (5) Economic and Social Aspects of the Industry; (6) Bibliography. The authors comprise a who's-who of the British rubber industry, including such familiar names as Fordyce Jones, B. J. Eaton, W. J. S. Naunton, D. F. Twiss, T. R. Dawson, J. M. Buist, G. L. Hammond, S. A. Brazier, T. J. Drakeley. Some of these authors, such as Dr. Twiss and Dr. Dawson, unfortunately did not live to see final publication of the work.

As Dr. Schidrowitz emphasizes in the foreword, the book is intended to be a history and not a technological survey. While it has been the object to show how the craft has developed technologically, scientifically and commercially, it has not been the aim to submit an account of it as it is at the present day. Necessarily, however, some reference to the present state of the industry has been included in certain parts. Following the same reasoning, "references" are not inserted in the manner or the kind usually found in scientific or purely technical publications, but are used only where the mention of a name or fact made a "reference" necessary or desirable.

It is not possible in a historical work of this kind to review the specific chapters or to comment on all of the controversial questions which come to mind, but mention may be made of two such controversies, namely, the discovery of vulcanization and the birth of the plantation industry.

It is surprising in a British publication to find that the discovery of vulcanization is credited to Charles Goodyear rather than to Thomas Hancock. In the chapter on "Vulcanization," prepared by R. W. Lunn, the point is made that Goodyear "distinguished himself by recognizing and stating the problem (vul-

STATEX
125

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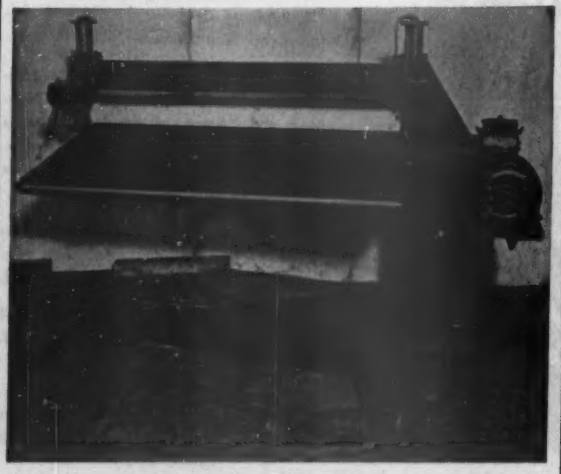

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canization), by working for its solution under conditions of extraordinary sacrifice and finally by arriving at a true solution to it." Further, Mr. Lunn points out that although in some quarters Hancock is regarded as a co-discoverer of vulcanization, "Hancock certainly makes no such claim and his personal narrative makes it quite clear that such a claim could not be supported."

The saga of Sir Henry Wickham, the "father" of the plantation rubber industry, is treated with briefly in the chapter on "Wild and Plantation Rubber Plants" by Lt.-Col. B. J. Eaton. No reference is made to the legend that Sir Henry "spirited" rubber seeds from Brazil, and the matter is treated in the following quotation: "The 'germ' of the (plantation) industry was the seed obtained by Mr. (later Sir) Henry Wickham in 1876, at the request of Sir Joseph Hooker, Director of the Kew Gardens, on the instigation of the Government of India. The seeds obtained by Wickham were the first to be successfully raised at Kew, from which seedlings were transported successfully to Ceylon, India, and Malaya."

•

Chemistry . . . Key to Better Living. Compiled by the Staff. Published by the American Chemical Society, 1155 Sixteenth St., N.W., Washington 6, D. C. 9¼ x 12 in. 244 pp. $4.00.

Issued in commemoration of the Diamond Jubilee celebrated by the American Chemical Society in 1951, and consisting of reproductions which originally appeared in both "Industrial and Engineering Chemistry" and "Chemical Engineering News," this attractive volume reviews the development of chemical science and its industrial applications in a series of papers on chemical progress during the 75 years since the founding of the society. The part the society and its various divisions played in the advancement of chemical knowledge and skill during this period is emphasized. The section on "Rubber Chemistry" was furnished by Dr. R. P. Dinsmore, vice-president in charge of research, Goodyear Tire & Rubber Co. The volume should be a valuable reference in the libraries of industrial concerns, research laboratories, and educational institutions.

•

Mincing Lane Rubber: 1952. Compiled and published by David H. S. Arakie, 44 Bow Lane, London E.C.4, England. 4¾ x 7¼ in. 254 pp.

Intended as a guide to investors, this reference work, part of a world commodity series planned by the compiler, lists all of the rubber producing companies in the world. Considerable information is furnished on each of the companies listed, including names of principal officers, capitalizations, dividend payments, planted areas, replanting activities, etc. The companies are listed under monthly groups, with which British investors are familiar, such listing being a useful aid for reference purposes. Comments on the rubber situation by outstanding authorities are also included, as are biographies of some celebrities in the rubber world. Other information of a financial character of specific interest to investors is also given.

STATEX 125

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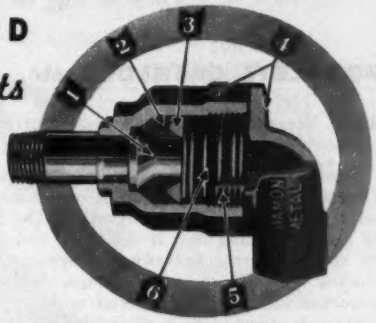

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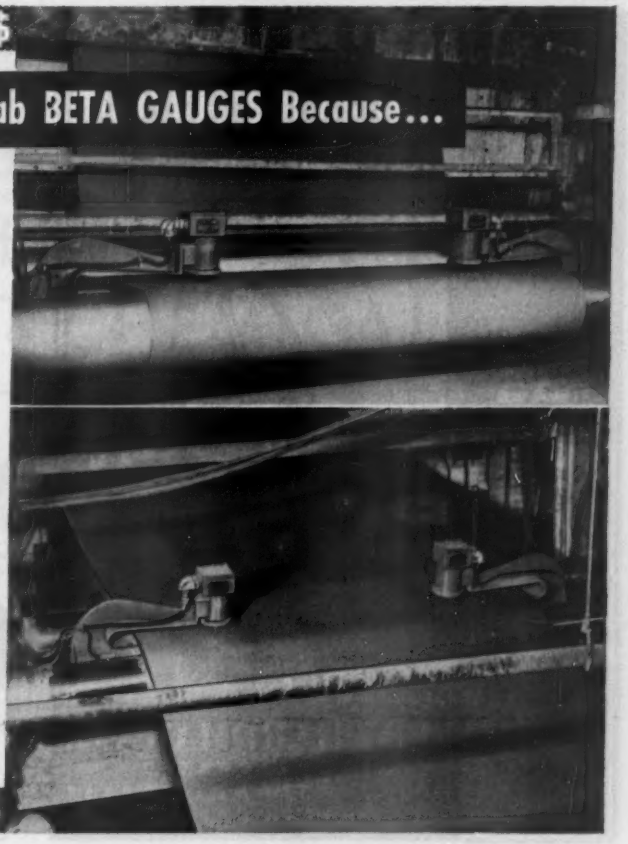

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REVIEWS (CONT'D)

BOOKLETS, CATALOGS, etc.

Atlas Weather-Ometers. Atlas Electric Devices Co., 361 West Superior St., Chicago 10, Ill. 8¾ x 11¼ in. 30 pp.

Comprehensive data on the various types of Weather-Ometers offered by the company for accelerated weathering tests is furnished in this literature. The general construction of the weathering unit is described and illustrated as well as its specific parts. Accessory equipment is also detailed, including vertical specimen drums, horizontal testing racks, specimen holders, and special units of various kinds. One section is devoted to a discussion of the principle of accelerated weathering.

•

S-K Spray Nozzles. (Bulletin No. 6-A). Schutte and Koerting Co., Cornwells Heights, Bucks County, Penna. 8 x 11 in. 20 pp.

Complete technical details on the line of atomizing and spray nozzles manufactured by the company are given in this bulletin. Sections are devoted to atomizing nozzles, spray nozzles, and spray nozzle clusters. Information given for each type of spray nozzle includes construction details, spray characteristics, and capacities. Dimension tables, capacity charts and drawings supplement the text.

•

Ledeen Valves. (Bulletin 1000). Ledeen Manufacturing Co., 1600 So. San Pedro St., Los Angeles 15, Calif., 8½ x 11 in. 16 pp.

This bulletin describes and illustrates the complete line of Ledeen valves and includes operating and circuit diagrams, dimensions and weights. These valves, embodying disc type construction, are used for operating air and hydraulic cylinders, single and double acting, and air motors. They are available in hand, foot, power and solenoid-operated models.

•

R. D. Wood—150th Anniversary. R. D. Wood Co., Public Ledger Bldg., Philadelphia 5, Penna. 8½ x 11 in. 32 pp.

Coincident with its 150th Anniversary, the company has reissued this photographic booklet covering certain of the firm's production activities. The booklet is designed to give an informative picture of some of the concern's facilities, methods, and equipment, particularly as they relate to hydraulic press and valve manufacture.

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REVIEWS (CONT'D)

Tri-Clad Gear Motors. (GEA-1437H). General Electric Co., Schenectady, N. Y. 8½ x 11 in. 16 pp.

The function, design, and application of gear motors are described in this bulletin. It describes the standard types of G-E "Tri-Clad" gear motors with ratings from 1/6 up to 200 hp. Cut-away photographs show the relative position of the parts which are distinctive to the design of each motor. Adaptability to low-speed jobs and adjustable-speed drives is explained along with the description of gear motor maintenance. The electrical types and characteristics as well as special mechanical features of gear motors are also given. A table listing more than 200 gear motor applications, explains how to select the proper motor depending on use, load classification, and length of daily operation.

•

Carbowax Polyethylene Glycols. (F-4772). Union Carbide & Carbon Corp., 30 East 42nd St., New York 17, N. Y. 8½ x 11 in. 52 pp.

This book describes with the aid of many formulas the varied uses of the water-soluble liquid and solid polyethylene glycols, and the methoxy polyethylene glycols in the rubber, pharmaceutical, textile, metal, agricultural, printing, petroleum, and electronics industries. It also discusses their use in cosmetics, cleaners and polishes, adhesives, resins, and paper products. A section on physical properties employing tables and charts characterizes these interesting compounds. Shipping and storage data for these compounds are also presented.

•

Continuous Gages and Controls. (Circular No. 553). Pratt & Whitney, Division of Niles-Bement-Pond Co., West Hartford 1, Conn. 8½ x 11 in. 28 pp.

Most of the instruments described in this circular are very versatile and can be adapted, by very small detail changes, to a wide variety of applications. Some of the units described in this publication include the "Electrolimit" gage, "Magnetic" gage, "Beta Ray Non-Contacting Gage," and a continuous gage. Also described are a full line of control units. Each of the units is illustrated and data as to its features, specifications and capacities are offered.

•

Everywhere in Industry. B. F. Goodrich Chemical Co., Rose Bldg., Cleveland 15, Ohio. 8½ x 11 in. 24 pp.

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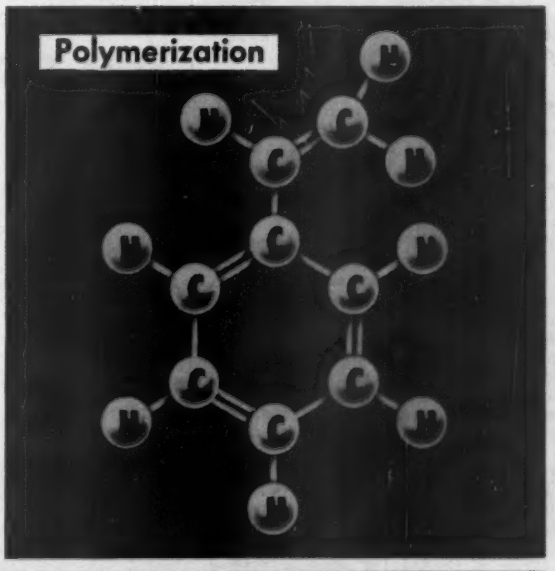

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MARKETS NEWS-PRICES

NEW YORK, MAY 8, 1953

Raw Rubber

Natural: Since our last report (April 7), the price of spot rubber on the New York Commodity Exchange has moved in a range of 3.50c, high for the period being 27.25c reached on May 4, and low being 23.75c reached on April 8. The average price of spot rubber for the month of April was 24.66c based on 21 trading days. This compares with an average of 26.59c in the previous month.

The trend of natural rubber prices during the month of April was almost the direct opposite of that in March. In March, the "highs" ruled near the beginning of the month, with the "lows" coming at the end. In April, the market was steady at the outset of the month and edged off in the first eight days and then showed a slow progressive advance with the prices at the end of the month close to those at the beginning.

Ribbed Smoked Sheets showed a recovery of about 1½c a pound with comparable gains in other grades. Rubber prices on the basis of No. 1 R.S.S. have again reached the historical level of 25c a pound and at this writing the price is slightly higher. A price level of 25c is considered as competitive with synthetic. Anything above that level brings natural beyond the competitive level and places that commodity in a less favorable position.

According to reports from Jakarta, Indonesia has agreed to ship $4,750,000 worth of rubber, tin and other raw materials to Communist Poland. In return, she will get an equivalent amount of machinery and other technical goods. The pact, effective May 1, represents a 50% increase over a previous agreement which expired at the end of 1952.

Synthetic: The United States Department of Commerce estimates that in the first three months of this year, 219,835 long tons of synthetic rubber were consumed in the United States, contrasted with the 206,641 long tons consumed in the first three months of 1952.

Stockpiling of synthetic rubber as part of a program to prevent the interruption of production during the transfer of government-owned plant to private ownership was recently suggested by P. W. Litchfield, chairman of the board of the Goodyear Tire & Rubber Co. Two steps, he said, must be taken to protect the nation's interests. First, that full production schedules be maintained, and second, that we begin now to create a reserve stockpile of at least 200,000 tons, building excesses beyond current requirements.

The first step is essential, said Mr. Litchfield, to provide enough synthetic rubber for our needs and to keep the price of natural within reasonable bounds. The stockpile is needed for security reasons, accentuated by the possibility of an interruption of production levels during the change of ownership, a period of possibly as long as two years, according to Mr. Litchfield.

Price Data

Closing Rubber Prices on New York Commodity Exchange (No. 1 R.S.S. Contract)

FROM APRIL 8 TO MAY 8

Apr.	Spot.	May	July	Sept.	Dec.	Sales
8	23.75	23.30	23.21	23.11	23.05	34
9	24.12	23.40	23.50	23.30	23.10	29
10	24.88	24.25	24.15	23.90	23.80	48
11	——	——	——	——	——	——
12	——	——	——	——	——	——
13	24.25	23.65	23.71	23.52	23.35	16
14	24.38	23.75	23.85	23.75	23.40	153
15	24.62	24.21	24.20	24.00	23.85	68
16	24.25	23.70	23.70	23.55	23.40	65
17	24.50	23.90	24.00	23.80	23.60	22
18	——	——	——	——	——	——
19	——	——	——	——	——	——
20	24.38	23.80	23.85	23.65	23.40	10
21	24.38	23.78	23.85	23.65	23.45	50
22	24.62	24.20	24.25	24.10	23.80	62
23	24.75	24.40	24.50	24.20	23.80	80
24	24.75	24.40	24.40	24.15	23.75	26
25	——	——	——	——	——	——
26	——	——	——	——	——	——
27	25.00	24.70	24.75	24.45	24.05	36
28	25.25	24.65	24.80	24.67	24.35	76
29	26.00	25.50	25.60	25.40	25.00	145
30	25.50	25.00	25.25	25.00	24.75	13
May						
1	26.00	25.30	25.50	25.30	24.90	14
2	——	——	——	——	——	——
3	——	——	——	——	——	——
4	27.25	26.90	26.90	26.65	26.30	127
5	26.50	26.25	26.25	26.00	25.55	45
6	26.38	25.90	26.20	25.95	25.60	64
7	25.75	25.45	25.40	25.30	24.90	59
8	25.50	25.00	25.25	24.95	24.60	40

Outside Market

No. 1 Ribbed Smoked Sheets:	
Spot	.25¾
May	.25¾
June	.25⅝
Thin Latex Crepe:	
Spot	.28¼
Thin Brown Crepe, No. 2	.23¼
Smoked Blankets	.22¾
Flat Bark Crepe	.20¾

London Market

(Standard Smoked Sheets)

June	25.23 - 25.52
July-Sept.	25.23 - 25.57

Singapore Market

(Standard Smoked Sheets)

June	24.06 - 24.17

Synthetic Rubber

(Dry Types—Per Pound)

Butaprene NF	.490 - .500
Butaprene NL	.500 - .510
Butaprene NAA	.540 - .550
Butaprene NXM	.580 - .590
Chemigum 30N4NS	.500 - .510
Chemigum 50N4NS	.500 - .510
Chemigum N3	.580 - .590
G-E Silicone Rubber (compounded)	3.15 -4.00
G-S Silicone Gum (not compounded)	—— -4.48
GR-I	—— - .2075
GR-S	—— - .230
Hycar OR-15	.580 - .590
Hycar OR-25	.500 - .510
Hycar OS-10	.550 - .560
Neoprene Types AC and CG	—— - .550
Neoprene Type GN	—— - .410
Neoprene Type GN-A	—— - .410
Neoprene Type GRT	—— - .420
Neoprene Type KNR	—— - .750
Neoprene Type Q	—— -1.00
Neoprene Type S	—— - .420
Neoprene Type W	—— - .410
Neoprene Type WRT	—— - .450
Paracril B	.500 - .510
Paracril BJ	.500 - .510
Paracril C	.580 - .590
Silastic (compounded)	2.35 -4.40
Thiokol Type A	—— - .470
Thiokol Type FA	—— - .640
Thiokol PR-1	—— - .950
Thiokol Type ST	—— -1.000

Middling Upland Quotations

	Apr. 7	May 8		
	Close	High	Low	Close
May	33.27	33.95	33.84	33.90
July	33.34	33.92	33.81	33.90
Oct.	33.38	33.70	33.64	33.67

Liquid Latex

Natural: It is estimated by the Department of Commerce that in the first three months of this year, 18,086 long tons of natural rubber latex were consumed in the United States, compared with the 12,172 long tons consumed in the first three months of 1952. Consumption approximates the amount imported, just over 6,000 tons a month. Stocks remain steady at the same figure, representing an approximate 30-day supply.

While the over-all demand for Hevea latex, both in the United States and the rest of the world, exceeds the expected supply, the immediate discrepancy is smaller than that of a few months ago, according to Latex and Rubber, Inc.

U. S. prices for "spot" or "nearby" delivery, in rail tank cars, for A.S.T.M. quality centrifuge concentrated Hevea latex have been about 37-38c a pound during the past few weeks. "Long term" contract commitment deliveries are running about 35-36c per pound.

Synthetic: U. S. prices of GR-S latices range from 21.5 to 26c per pound solids, in tank cars f.o.b. works; a uniform freight rate of 1c per pound wet weight charged by the RFC pays freight to the buyer's destination within the U. S. Consumption of neoprene latices within the U. S. is running at about 700 tons per month with production slightly larger than demand. Acrylonitrile latices are being consumed at a rate of 300 tons per month, with production slightly in excess of this figure .

Cotton

The price of middling uplands on the New York Cotton Exchange has moved in a range of 1.20c since our last report (April 7), high for the period being 34.70c reached on May 4, and low being 33.50c reached on April 22. The average price of middling uplands for the month of April was 33.85c based on 21 trading days. This compares with an average of 34.10 in March.

The International Cotton Advisory Committee has estimated the free world carry-over of cotton on August 1, 1952, at 13,300,000 bales, 2,700,000 bales over the previous year. Free world carry-over stocks on August 1, 1953, are expected to rise to between 15,500,000 and 16,000,000 bales.

Arrangements have now been completed for the operation of a credit of $40,000,000 for the purchase and export of cotton to Japan recently authorized by the Export-Import Bank. This credit, bearing interest at 3.5% per annum and repayable in fifteen months, is extended to the Bank of Japan, which will designate Japanese commercial banks as its agents.

The Department of Agriculture has revised last year's acreage in cultivation to 26,922,000 acres, and last year's acres harvested to 25,664,000. The yield per harvested acre in 1952 was 182.7 pounds, and the yield per planted acre was 269.4 pounds. Production in 1952 has been revised to 15,136,000 bales.

Government acreage curbs on the 1954 cotton crop were described as "likely" by Secretary of Agriculture E. Benson in recent testimony before a Senate Committee. Burdensome supplies, favorable weather, declining exports plus existing laws make likely the necessity of imposing controls, he said.

MARKETS
NEWS-PRICES

NEW YORK, MAY 8, 1953

Reclaimed Rubber

According to the trade, March was a good month for sales and consumption of reclaimed rubber with April holding to this trend. The Department of Commerce reports that in the first three months of this year, 76,180 long tons of reclaimed rubber were consumed in the United States, against the 75,868 long tons consumed in the first three months of the preceding year.

Production of reclaim in the first quarter of 1953 is estimated at 79,039 long tons, contrasted with 74,446 long tons in the first quarter of 1952. Imports of reclaim in the first quarter of this year totaled 1,026 long tons, while 195 tons were imported in the same period of 1952.

As of March 31, 1953, there were 29,931 long tons of reclaimed rubber on hand, while on March 31, 1952, there were 40,579 long tons on hand. The department also estimates that in the first three months of this year, 2,724 long tons of reclaim were exported, while in the first three months of 1952, 2,853 long tons were exported. Current prices follow:

(Prices for All Areas Except Calif.)

	per lb.
Premium Grade Whole Tire	.10½
First Line Whole Tire	.10
Second Line Whole Tire	.09½
Third Line Whole Tire	.09¼
Fourth Line Whole Tire	.08¾
Black Carcass	.14¼
No. 1 Light Colored Carcass	.20¾
No. 1 Select Peel	.11¾
No. 1 Peel	.10½
Butyl Tube Reclaim	.12½
S.P. Natural Rubber Black Tube	.16
Natural Rubber Black Tube	.15
Natural Rubber Red Tube	.24¼
Natural Rubber Gray Tube	.24¼

Tire Fabrics

In view of the substantial volume of tire sales which have been anticipated for the coming year by some spokesmen in the field, the purchasing policy on chafers appears to have been unusually cautious. Production of tires is expected to surpass the available supply of rayon cord late this year, it is said, and consequently, there should be a need for substantial quantities of chafer fabrics.

Trading in chafers and hose and belting ducks has quickened only recently after weeks of lethargic activity. Most of the transactions were for June delivery. Some tire manufacturers, however, also purchased for both May and June since they had previously held off making any advance commitments. Prices for industrial fabrics have remained at fairly steady levels during the past period. Current prices follow:

(Prices f.o.b. Shipping Point)

Rayon Tire Cord

1100	lb.	.76½
1650	lb.	.73½
2200	lb.	.73

Nylon Tire Cord

210	lb.	2.00
840	lb.	2.00

Rayon Graded Fabric

1100	lb.	.72
1650	lb.	.69½
2200	lb.	.68½

Cotton Chafers

14.4 oz. (per square yard)	lb.	.74
9.25 oz. (per square yard)	lb.	.69½
11.65 oz. (per square yard)	lb.	.66
8.9 oz. (per square yard)	lb.	.71

Scrap Rubber

Business in the scrap rubber market during the past period continued on the slow side, both at eastern and midwestern points. On the supply side, available stocks of Butyl tubes were reported good, with black and red passenger tubes in fair supply. Some business was being done in mixed automobile tires, but there was definitely no volume buying.

Mixed tires in the east brought about $12 for shipments guaranteed to contain a 30% minimum of truck and bus, and at $13.50 to $14.00 in the midwest. Suppliers who ship mixed automobile tires not meeting the 30% requirement are subject to charge-back, in some instances up to $3.00 a ton. Current prices follow:

(Prices Delivered Akron)

Mixed tires	ton	15.50
Light colored carcass	lb.	.05
No. 1 peelings	ton	48.00
No. 2 peelings	ton	30.00
No. 3 peelings	ton	24.00
Buffings	ton	18.00
Truck and Bus S.A.G.	ton	18.00
Passenger S.A.G.	ton	17.00
Natural Rubber Red Tubes	lb.	.13
Natural Rubber Black Tubes	lb.	.04½
Butyl Rubber Tubes	lb.	.03½

Rubber

Natural – Synthetic

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Cumberland 3-1400

STATISTICS *Of Interest to the Rubber Industry*

U. S. Imports and Re-Exports of Natural Rubber

	GROSS IMPORTS											
	Natural Rubber (Dry)			Natural Rubber (Latex)			Guayule				RE-EXPORTS		TOTAL NET IMPORTS
Year	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Total Gross Imports Long Tons	Long Tons	Total Declared Value	Long Tons
1936	467,064	152,072,496	14.54	19,852	6,659,899	14.98	1,229	286,552	10.41	488,145	12,581	4,488,223	475,564
1937	574,600	237,307,041	18.44	23,185	10,213,670	19.67	2,691	745,873	12.37	600,476	7,948	3,386,408	592,528
1938	397,640	125,373,864	14.08	11,944	4,168,127	15.58	2,508	628,886	11.19	412,092	5,652	1,799,124	406,440
1939	469,946	167,586,780	15.92	27,437*	10,467,552	17.03	2,233	463,345	9.27	499,616	13,125	5,832,618	486,491
1940	781,202	303,308,823	17.33	33,789	14,593,466	19.28	3,633*	748,007	9.31	818,624	7,060	3,197,136	811,564
1941	989,498	401,976,317	18.14	34,797*	15,965,627	20.48	4,881	1,145,767	10.48	1,029,176	5,376	2,757,872	1,023,800
1942	266,276	112,537,426	18.87	10,646	5,630,667	23.61	5,523	1,660,792	13.42	282,445	10,856	5,913,386	271,589
1943	50,358	31,369,198	27.81	1,890	1,312,202	31.00	7,678*	3,636,789	21.14	59,926	22,583	16,446,707	37,343
1944	103,847	73,908,549	31.77	3,091	2,092,211	30.22	6,701*	3,351,233	22.33	113,639	9,739	8,712,695	103,900
1945	134,408	95,814,102	31.82	4,773	3,115,853	29.14	10,040	5,963,797	26.52	149,221	9,509	7,201,746	139,712
1946	376,502	228,796,110	27.13	8,421	5,843,085	30.98	5,344	2,859,246	23.89	390,267	7,711	5,331,954	382,556
1947	691,087	306,951,814	19.83	17,542	9,787,722	24.91	2,884	1,492,825	23.11	711,513	4,121	2,354,494	707,392
1948	702,293	290,849,177	18.49	32,745	18,288,223	24.93	302	71,330	10.53	735,340	6,672	3,259,324	728,668
1949	630,808	225,343,624	15.95	29,743	14,968,650	22.47	....	.....	....	660,551	6,253	2,746,109	654,298
1950	747,109	416,222,598	24.87	54,401	41,764,486	34.27	739	254,331	15.37	802,249	8,640	6,832,821	793,609
1951	677,874	727,343,348	47.90	54,963	80,178,309	65.12	1,619	1,258,941	34.71	734,456	2,603	3,947,740	731,853
1952	755,774	577,292,612	32.12	47,405	40,493,096	38.13	779	358,095	20.23	803,958	4,422	2,592,099	633,250
1952:													
Jan.	80,561	76,995,564	42.67	2,569	3,299,142	39.95	153	97,922	28.60	83,283	140	207,976	83,143
Feb.	73,781	70,775,631	42.82	2,556	3,016,023	52.66	45	29,061	28.58	76,382	95	120,410	76,287
Mar.	81,577	76,567,896	41.90	3,570	4,149,537	51.88	25	12,701	22.68	85,172	93	127,007	85,079
Apr.	78,098	71,497,007	40.87	4,821	4,402,416	40.77	55	27,927	22.67	82,974	85	103,819	82,889
May	55,764	45,898,163	36.74	3,409	3,140,619	41.12	15	7,644	22.62	59,188	130	150,568	59,058
June	62,744	48,168,471	34.27	4,445	3,934,931	30.62	74	28,985	16.85	67,263	1,555	190,975	65,708
July	45,718	30,026,066	29.32	2,295	2,378,572	33.74	412	153,855	16.66	48,425	135	128,437	48,290
Aug.	62,455	37,485,360	26.79	4,684	3,513,319	33.49	....	.....	....	67,139	373	278,927	66,766
Sept.	47,696	28,223,624	26.42	3,813	2,771,909	32.45	....	.....	....	51,509	279	202,978	51,230
Oct.	50,762	29,340,768	25.84	4,890	3,272,571	29.88	....	.....	....	55,652	337	248,642	55,315
Nov.	44,458	24,209,723	24.32	4,321	2,866,961	29.62	....	.....	....	48,779	585	414,704	48,194
Dec.	72,160	38,104,339	23.57	6,032	3,817,116	28.25	....	.....	....	78,192	615	417,656	77,577
1953:													
Jan.	57,516	31,296,490	24.29	6,250	4,168,234	29.77	....	.....	....	63,766	528	375,052	63,238

Source: Bureau of the Census, U. S. Department of Commerce. * Adjusted to agree with total gross imports.

Notes: (1) Figures for latex are on a dry weight basis. (2) Figures for re-exports include natural rubber (dry and latex) and guayule. (3) In the years 1940 through 1943, crepe sole rubber imports were reported under separate classification. Such imports, which are included under natural rubber, dry above, were: 856,294 pounds, valued at $191,097 in 1940; 379,607 pounds, valued at $85,924 in 1941; 662,503 pounds, valued at $159,530 in 1942; and 21,653 pounds, valued at $5,215 in 1943.

Natural Rubber
(Including Latex and Guayule)

(All Quantities in Long Tons)

Year	New Supply	Consumption	Re-Exports	Stocks On Hand at End of Period
1937	600,479	543,600	7,902	262,204
1938	411,983	437,031	5,652	231,500
1939	499,473	592,000	13,125	125,800
1940	818,243	648,500	7,060	288,864
1941	1,029,007	775,000	5,376	533,344
1942	282,653	376,791	10,856	422,714
1943	55,329	317,634	20,815	139,594
1944	107,834	144,113	9,665	93,650
1945	135,672	105,429	6,743	118,715
1946	400,687	277,597	4,338	237,467
1947	688,354	562,661	4,101	129,038
1948	735,227	627,332	6,673	141,541
1949	660,792	574,522	6,253	106,619
1950	802,249	720,268	8,644	89,215
1951	733,048	454,015	2,603	76,569
1952	805,997	453,846	3,024	95,260
1952:				
Jan.	83,283	36,989	140	75,488
Feb.	76,383	34,841	95	73,959
Mar.	85,172	35,682	93	61,553
Apr.	82,974	36,417	85	59,422
May	59,188	36,437	130	63,988
June	67,246	36,946	156	72,995
July	49,251	32,760	136	84,839
Aug.	67,139	32,941	373	86,657
Sept.	52,785	45,110	279	84,150
Oct.	55,651	45,110	337	82,861
Nov.	48,777	41,749	585	86,243
Dec.	78,148	44,790	615	95,260
1953:				
Jan.	57,517	47,766	528	97,730
Feb.	48,455	45,231	981	94,151
Mar.	.....	50,470	755	98,100

Source: Rubber Division, NPA, U. S. Department of Commerce.

U.S. Gross Imports of Balata, Jelutong, Gutta-Percha, etc.

(All Quantities in Long Tons)

	Balata		Jelutong		Gutta-Percha & Other Guttas	
Year	Tons	Value	Tons	Value	Tons	Value
1936	535	199,368	6,163	1,296,364	1,568	555,643
1937	354	151,344	7,109	2,017,786	1,122	440,894
1938	509	181,140	9,132	2,944,504	444	204,582
1939	694	265,553	6,640	1,603,418	1,740	539,255
1940	648	300,500	7,451	2,449,137	2,340	1,004,885
1941	924	489,514	8,821	2,954,001	1,783	607,025
1942	1,544	1,107,059	1,200	530,296	804	525,763
1943	1,047	708,701	35	14,840	....	.....
1944	1,012	660,805	88	45,578	10	4,999
1945	1,361	907,253	....	.....	36	21,970
1946	2,281	2,233,065	304	256,169	423	458,064
1947	1,982	2,276,531	2,878	1,496,887	392	779,591
1948	1,195	805,078	3,401	2,377,765	423	542,788
1949	1,391	814,554	1,043	834,978	197	189,021
1950	2,117	1,589,885	1,789	1,515,162	541	745,418
1951	2,452	1,973,271	1,669	2,608,359	383	430,539
1952	988	762,995	1,549	2,407,716	283	284,008
1952:						
Jan.	126	95,203	204	375,802	27	59,439
Feb.	31	23,118	15	211,229	10	33,474
Mar.	50	43,207	128	217,096	27	43,861
Apr.	49	31,239	234	409,076	32	41,391
May	57	32,488	92	141,257	26	27,853
June	57	31,787	212	273,357	50	50,941
July	55	35,941	100	148,350	16	18,422
Aug.	16	9,037	142	193,364	28	31,011
Sept.	109	51,414	148	183,692	15	12,291
Oct.	130	125,137	95	99,181	20	17,937
Nov.	176	139,154	78	67,764	18	23,392
Dec.	132	145,270	101	87,548	14	25,878
1953:						
Jan.	...	.....	77	155,276	6	10,474

Source: U. S. Department of Commerce.

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Synthetic Rubber—Totals

(GR-S, Neoprene, Butyl, and Buna N Types)

(All Quantities in Long Tons)

Year	Production	Imports	Consumption	Exports	Stocks On Hand at End of Period
1942	22,434	.....	17,651	1,419	4,612
1943	231,722	.....	170,891	18,148	41,568
1944	762,630	11,043	566,670	104,266	142,927
1945	820,373	10,407	693,580	83,778	203,454
1946	740,026	7,709	761,699	72,920	114,963
1947	508,702	1,093	559,566	11,385	62,366
1948	488,343	15,671	442,072	4,874	115,111
1949	393,690	17,242	414,381	6,483	98,042
1950	476,184	25,722	538,289	7,652	52,758
1951	845,159	10,085	758,897	9,249	129,912
1952	798,556	19,891	807,037	22,101	118,987
1952:					
Dec.	65,740	1,523	71,635	1,323	118,987
1953:					
Jan.	69,482	1,516	72,810	1,487	117,875
Feb.	66,975	1,240	68,860	....	114,648

Source: U. S. Department of Commerce.
Notes: (1) These figures are revised from time to time and the latest available issue should be consulted for the most accurate data. (2) Figures shown include the output of both government and privately-owned plants. (3) Figures for 1941 are estimated.

Synthetic Rubber—By Type

(All Quantities in Long Tons)

New Supply

	GR-S (Buna S)	GR-M (Neoprene)	GR-I (Butyl)	Buna N Types	Total
1945	724,859	45,672	52,378	7,871	830,780
1946	613,408	47,766	80,823	5,738	747,735
1947	408,858	31,495	62,824	6,618	509,795
1948	405,492	34,848	56,662	7,012	504,014
1949	310,599	35,215	54,046	11,072	410,932
1950	378,887	50,067	60,913	12,037	501,906
1951	704,529	58,907	76,475	15,333	855,244
1952	654,854	65,745	81,630	16,228	818,457

Consumption

1945	600,145	42,394	43,012	8,029	693,580
1946	632,126	44,357	79,228	5,988	761,699
1947	448,589	37,703	68,838	4,536	559,666
1948	345,313	32,118	58,870	5,771	442,072
1949	299,420	31,753	50,855	8,827	414,381
1950	416,230	43,781	66,348	11,930	538,289
1951	626,444	48,887	70,500	13,066	758,897
1952	666,420	55,522	71,229	13,866	807,037

Exports

1945	76,555	5,837	980	406	83,778
1946	68,763	2,642	495	797	72,697
1947	7,951	2,617	62	755	11,385
1948	1,093	2,875	21	885	4,874
1949	1,401	3,330	178	1,574	6,483
1950	900	4,826	31	1,895	7,652
1951	483	6,825	216	1,725	9,249
1952	9,467	9,813	126	2,695	22,101

Stocks at End of Period

1945	170,571	9,703	18,378	4,802	203,454
1946	81,483	10,470	19,478	3,755	115,186
1947	40,606	5,237	13,184	3,339	62,366
1948	96,282	5,072	10,995	2,762	115,111
1949	77,731	4,654	12,224	3,433	98,042
1950	36,942	5,733	7,243	2,840	52,758
1951	105,271	8,379	12,481	3,821	129,912
1952	83,861	8,535	22,716	3,875	188,987

Source: U. S. Department of Commerce.
Notes: (1) These figures are revised from time to time and the latest available issue should be consulted for the most accurate data. (2) Figures for GR-M and Buna N Types include production of privately-owned plants.

Gasoline Consumption

(In Thousands of Barrels of 42 Gallons)

	1946	1947	1948	1949	1950	1951	1952	1953
Jan.	51,746	57,057	61,308	63,125	66,981	80,670	86,863	89,634
Feb.	47,654	50,551	56,487	57,980	53,274	72,864	82,043	.....
Mar.	56,703	59,947	68,171	73,282	78,780	86,962	87,065	.....
Apr.	62,111	64,140	72,183	75,318	80,350	87,573	98,653	.....
May	66,800	70,863	77,186	81,665	89,035	100,266	101,137	.....
June	63,247	71,329	78,044	83,374	90,174	96,364	99,305	.....
July	60,076	73,441	81,428	83,129	91,677	100,567	105,307	.....
Aug.	66,729	72,089	80,351	84,707	94,507	101,453	102,954	.....
Sept.	62,268	71,384	76,159	80,832	86,725	91,891	100,095	.....
Oct.	66,637	73,277	75,164	79,327	89,067	100,209	103,689	.....
Nov.	61,345	64,158	72,560	76,346	82,688	88,581	91,326	.....
Dec.	61,101	67,506	72,162	75,628	81,032	84,551	95,817	.....
Total	735,417	795,015	871,270	913,713	994,290	1,091,951	1,154,254	

Source: U. S. Bureau of Mines.

Reclaimed Rubber

(Including Natural and Synthetic)

(All Quantities in Long Tons)

Year	Production	Consumption—Tons	Consumption—% to Crude [a]	Exports	Stocks On Hand at End of Period
1937	185,033	162,000	29.8	13,233	28,800
1938	122,400	120,800	27.6	7,403	23,000
1939	186,000	170,000	28.7	12,611	25,250
1940	208,971	190,244	29.3	11,347	32,636
1941	274,202	251,231	32.2	13,851	41,750
1942	286,007 [b]	254,820	64.6	30,405	42,532
1943	304,058 [c]	291,082	59.6	15,678	46,201
1944	260,631 [d]	251,083	35.3	11,800	43,832
1945	243,309	241,036	30.2	13,413	28,155
1946	295,612	275,410	26.5	14,461	33,666
1947	291,395	288,395	24.8	14,556	35,943
1948	266,861	261,113	24.4	11,428	32,630
1949	224,029	226,679	22.5	10,637	28,263
1950	314,008	303,733	24.1	11,740	35,708
1951	366,700	346,121	28.6	14,722	45,082
1952	274,981	280,002	22.2	11,180	30,664
1952:					
Oct.	27,612	26,830	22.5	806	31,463
Nov.	23,068	22,896	21.2	1,050	30,176
Dec.	25,642	24,300	20.9	1,012	30,664
1953:					
Jan.	27,258	24,696	20.5	866	31,244
Feb.	24,583	24,098	21.1	950	30,631
Mar.	28,224	27,386	21.3	908	29,931

Source: U. S. Department of Commerce.
Notes: (1) These figures are revised from time to time and the latest available issue should be consulted for the most accurate data. [a] Includes natural and synthetic rubber. [b] Includes 893 tons of imports. [c] Includes 67 tons of imports. [d] Includes 21 tons of imports.

Automobile Production in U. S.

(Civilian Production Only)

Year	Passenger Cars	Trucks	Total	Year	Passenger Cars	Trucks	Total
1933	1,573,512	346,545	1,920,057	1943	0	4,501	4,501
1934	2,177,919	575,192	2,753,111	1944	0	124,819	124,819
1935	3,252,244	694,690	3,946,934	1945	83,792	313,643	397,435
1936	3,669,528	781,862	4,451,390	1946	2,148,699	930,760	3,079,459
1937	3,915,889	892,382	4,808,271	1947	3,558,178	1,220,634	4,778,812
1938	2,000,985	485,852	2,486,837	1948	3,909,270	1,363,856	5,273,126
1939	2,866,796	704,308	3,571,104	1949	5,108,841	1,123,736	6,232,577
1940	3,692,328	721,637	4,413,965	1950	6,665,836	1,332,263	7,998,099
1941	3,744,500	875,381	4,619,681	1951	5,337,729	1,420,432	6,758,161
1942	220,814	133,083	353,897	1952	4,320,788	1,212,390	5,533,178
1952:							
Jan.	273,639	100,993	374,632	July	168,327	43,231	211,558
Feb.	334,058	100,533	434,591	Aug.	218,577	52,056	270,633
Mar.	373,237	109,167	482,404	Sept.	438,397	112,375	550,772
Apr.	416,155	112,833	528,988	Oct.	471,808	132,064	603,872
May	398,286	105,208	503,494	Nov.	405,111	114,106	519,217
June	408,700	109,526	518,226	Dec.	418,977	115,814	534,791
1953:							
Jan.	453,319	111,599	564,918	July	.....	.....	.....
Feb.	486,071	96,740	582,811	Aug.	.....	.....	.....
Mar.	566,320	134,129	700,449	Sept.	.....	.....	.....
Apr.	.....	.....	.....	Oct.	.....	.....	.....
May	.....	.....	.....	Nov.	.....	.....	.....
June	.....	.....	.....	Dec.	.....	.....	.....

Source: Automobile Manufacturers Association.
Note: Figures are based on factory sales. Revisions are made from time to time in these figures and the latest issue should be consulted for accuracy.

Rim Production

	1948	1949	1950	1951	1952
Passenger Car	23,842,796	27,715,344	35,096,404	29,145,367	24,936,844
Truck & Bus	6,920,231	4,238,174	6,625,129	6,877,419	5,752,674
Agricultural	3,140,882	2,695,430	2,853,483	3,019,581	2,073,116
Earth Mover	13,330	9,895	15,602	28,026	31,791
Total	33,917,239	34,658,843	44,590,618	39,070,393	32,794,425

	1952 Oct.	1952 Nov.	1952 Dec.	1953 Jan.	1953 Feb.	1953 Mar.
Passenger Car	2,537,018	2,352,973	2,561,628	2,646,978	2,667,879	3,116,429
Truck & Bus	558,605	446,943	595,829	582,137	508,171	634,586
Agricultural	157,931	109,250	141,251	259,023	201,019	227,518
Earth Mover	2,396	3,594	2,687	2,095	2,767	3,424
Total	3,255,950	2,913,060	3,301,395	3,490,233	3,379,836	3,981,957

Source: The Tire & Rim Association, Inc.

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(Thousands of Units)

	Shipments					
	Original Equipment	Replacement	Export	Total	Production	Inventory End of Period
1942 (total)	6,680	8,872	207	15,759	15,351	6,247
Passenger Car.	910	2,734	38	3,682	2,790	4,432
Truck and Bus	5,770	6,138	169	12,077	12,561	1,815
1943 (total)	6,128	18,547	225	24,900	20,423	1,883
Passenger Car.	82	10,606	71	10,759	7,620	1,132
Truck and Bus	6,046	7,941	154	14,141	12,803	751
1944 (total)	6,654	26,439	263	33,356	33,446	2,013
Passenger Car.	208	18,330	130	18,668	18,819	1,218
Truck and Bus	6,446	8,109	133	14,688	14,627	795
1945 (total)	5,984	36,479	504 *	42,967	44,524	3,077
Passenger Car.	1,115	25,463	222	26,800	28,200	2,214
Truck and Bus	4,869	11,016	282	16,167	16,324	863
1946 (total)	15,310	65,490	1,512	82,312	82,298	2,448
Passenger Car.	11,086	54,684	653	66,423	66,466	1,763
Truck and Bus	4,224	10,806	859	15,889	15,832	685
1947 (total)	25,056	62,871	3,256	91,183	95,550	6,949
Passenger Car.	19,644	52,857	1,608	74,109	77,795	5,444
Truck and Bus	5,412	10,014	1,648	17,074	17,755	1,505
1948 (total)	26,845	49,148	1,787	77,781	81,314	10,698
Passenger Car.	21,589	41,295	656	63,540	66,738	8,773
Truck and Bus	5,256	7,853	1,132	14,241	14,576	1,925
1949 (total)	31,584	43,466	1,467	76,517	76,369	10,638
Passenger Car.	28,129	36,440	509	65,077	65,140	8,904
Truck and Bus	3,456	7,026	958	11,440	11,228	1,734
1950 (total)	41,349	56,808	1,430	99,587	92,754	3,794
Passenger Car.	36,678	47,103	642	84,423	78,598	3,050
Truck and Bus	4,671	9,705	788	15,164	14,156	743
1951 (total)	32,153	44,612	1,677	78,442	83,405	8,765
Passenger Car.	26,729	34,226	723	61,678	65,546	6,973
Truck and Bus	5,424	10,386	954	16,764	17,859	1,791
1952 (total)	29,484	54,402	1,521	85,407	90,522	14,093
Passenger Car.	24,102	45,525	742	70,369	74,441	11,245
Truck and Bus	5,381	8,877	779	15,038	16,081	2,849
1952:						
Oct. (total)	3,200	4,532	114	7,846	8,663	10,821
Passenger Car.	2,635	3,584	59	6,277	7,185	8,244
Truck and Bus	565	948	55	1,569	1,478	2,578
Nov. (total)	2,665	3,140	86	5,892	7,384	12,272
Passenger Car.	2,188	2,433	42	4,663	6,071	9,612
Truck and Bus	478	708	44	1,229	1,313	2,659
Dec. (total)	2,916	3,173	137	6,226	7,945	14,093
Passenger Car.	2,446	2,447	83	4,976	6,520	11,245
Truck and Bus	470	725	55	1,250	1,425	2,849
1953:						
Jan. (total)	3,004	4,794	84	7,882	8,238	14,118
Passenger Car.	2,563	3,916	33	6,512	6,824	11,288
Truck and Bus	440	878	51	1,369	1,414	2,830
Feb. (total)	3,263	3,895	85	7,243	8,236	15,295
Passenger Car.	2,764	3,161	28	5,953	6,847	12,310
Truck and Bus	499	735	57	1,290	1,389	2,985

Source: The Rubber Manufacturers Association, Inc.

Cotton, Rayon and Nylon Tire Fabrics

(Production in Thousands of Pounds)

	Cotton				Rayon and Nylon[b]		
	Tire Cord Not Woven	Cord Fabric Woven	Chafer and All Other Tire Fabrics	Total	Tire Cord Not Woven	Tire Cord And Other Tire Fabrics	Total
1948:							
Jan.-Mar.	18,546	50,251	19,391	88,188	a	60,569	60,569
Apr.-June	15,585	45,385	18,213	79,183	a	59,759	59,759
July-Sept.	29,743	45,927	c	75,670	a	63,642	63,642
Oct.-Dec.	13,321	34,424	15,879	63,624	a	65,258	65,258
Total	77,195	175,987	53,483	306,665	.....	249,228	249,228
1949:							
Jan.-Mar.	d	33,213	25,395	56,608	a	68,296	68,926
Apr.-June	5,309	29,114	13,617	48,040	a	68,269	68,269
July-Sept.	1,343	16,620	11,141	29,104	15,640	55,969	71,609
Oct.-Dec.	180	17,650	11,886	29,716	12,967	58,890	72,857
Total	6,832	96,597	62,039	163,468	28,607	351,424	281,661
1950:							
Jan.-Mar.	3,939	19,210	12,948	36,097	12,469	60,981	73,450
Apr.-June	11,077	29,498	14,071	54,646	11,510	59,966	71,476
July-Sept.	10,529	39,792	15,101	65,152	13,161	61,614	74,775
Oct.-Dec.	13,314	37,759	14,403	65,578	12,942	63,399	76,341
Total	38,859	126,259	56,525	221,473	50,082	245,960	296,476
1951:							
Jan.-Mar.	11,497	38,269	16,737	66,503	11,878	65,512	77,390
Apr.-June	12,608	42,491	17,055	72,154	11,979	61,957	73,936
July-Sept.	16,744	44,340	17,433	78,517	12,091	67,982	80,073
Oct.-Dec.	14,237	43,820	13,899	71,956	a	83,354	83,354
Total	55,116	168,920	65,124	289,160	35,948	278,805	314,753

Source: U. S. Bureau of the Census.

Notes: (a) Included with tire cord and fabrics to avoid disclosures of operations of individual mills. (b) Fuel cell fabrics are not included with rayon and nylon tire cord and fabrics. (c) Included with tire cord not woven. (d) Included with chafer and all other tire fabrics.

Automotive Inner Tubes

(Thousands of Units)

	Shipments					
	Original Equipment	Replacement	Export	Total	Production	Inventory End of Period
1944	6,460	20,569	196	27,224	27,488	2,813
1945	5,988	33,906	411	40,304	41,742	3,627
1946	15,327	59,357	1,424	76,108	77,251	3,820
1947	25,046	46,560	2,483	74,088	79,181	3,059
1948	26,833	40,548	1,119	68,499	70,033	9,641
1949	31,521	31,450	887	63,858	65,114	10,657
1950	41,240	42,671	811	84,723	80,179	....
1951	32,151	32,284	1,071	65,507	67,249	10,094
1952	29,471	32,931	1,015	63,418	65,039	11,744
1952:						
Nov.	2,667	1,898	52	4,617	5,117	10,910
Dec.	2,910	1,901	57	4,869	5,644	11,744
1953:						
Jan.	3,012	4,477	49	7,538	6,130	10,169
Feb.	3,261	3,052	51	6,364	6,428	10,308

Source: The Rubber Manufacturers Association, Inc.

Smoked Sheets—Spot Closing Prices

(New York Market—Cents per Pound)

Year	High	Low	Avg.	Year	High	Low	Avg.
1911	184	114	141.30	1932	4¾	2½	3.49
1912	140	108	121.60	1933	9⅞	2¾	5.96
1913	113	59	82.04	1934	15⅞	8¾	12.92
1914	93	56	65.33	1935	13¾	10½	12.37
1915	79	58½	65.85	1936	23	13½	16.41
1916	102	55	72.50	1937	26⅞	14	19.39
1917	90	52	72.23	1938	17⅞	10¼	14.64
1918	70	40	60.15	1939	24	14⅜	17.57
1919	57	38½	48.70	1940	24	18¼	20.10
1920	56½	16	36.30	1941	24⅜	19¼	22.40
1921	21¾	11½	16.36	1942	22½	22¼	22.50
1922	28¾	13¾	17.50	1943	22½	22½	22.50
1923	37½	24¾	29.45	1944	22½	22½	22.50
1924	40¼	17¾	26.20	1945	22½	22½	22.50
1925	121	34¾	72.46	1946	22½	22½	22.50
1926	88½	36¾	48.50	1947	25	14	20.00
1927	41¼	33	37.72	1948	25	18	21.99
1928	41¾	17	22.48	1949	19¾	15⅞	17.57
1929	26⅞	15½	20.55	1950	86	18	41.10
1930	16¼	7½	11.98	1951	76	52	(a)
1931	8¾	4¾	6.17	1952*	33	26½	29.15

Note: Price was fixed by Government on August 6, 1941, at 22½c a pound for non-war uses. Free trading was resumed May 1, 1947. (a) Free trading suspended March 31, 1951. GSA selling price ranged between 52 and 66c during balance of year. * Free trading was resumed on July 1, 1952; figures represent only July through December, 1952.

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market—in Cents)

Average Monthly Price Per Pound

	1946	1947	1948	1949	1950	1951	1952	1953
Jan.	25.49	32.58	36.09	33.37	31.89	45.04	42.96	33.24
Feb.	26.57	33.91	33.63	33.41	32.79	(a)	41.64	33.76
Mar.	27.52	35.89	35.04	33.44	32.65	46.06	41.70	34.10
Apr.	28.40	35.89	38.10	33.84	33.23	46.06	41.79	33.85
May	28.17	36.51	38.57	33.73	33.64	46.06	39.68	....
June	29.89	37.83	38.12	33.56	34.61	46.06	41.31	....
July	34.11	38.03	34.89	32.99	38.11	41.21	40.37	....
Aug.	36.31	34.83	32.23	32.06	38.93	35.93	40.42	....
Sept.	37.59	32.21	31.92	30.94	41.62	36.20	39.75	....
Oct.	36.79	32.39	32.01	30.32	40.66	38.13	37.52	....
Nov.	31.50	34.50	32.15	30.52	43.11	42.70	35.59	....
Dec.	33.03	36.74	32.90	31.08	43.37	43.32	33.76	....
Average for Year	31.28	35.11	34.64	32.44	37.05	42.43	39.71	....

Note: The Government established a ceiling price of 45.76c for spot cotton on March 3, 1951. (a) Trading suspended during February.

Consumption of Vinyl Resins

(In Thousands of Pounds)

	Sheeting and Film [a]	Textile and Paper Coating Resins	Molding and Extrusion Materials	All Other
1950	227,149	46,044	113,889	21,868
1951	161,547	43,688	134,890	23,934
1952	154,902	42,298	140,872	31,793
1952:				
Nov.	13,666	3,932	13,956	3,119
Dec.	12,874	3,483	14,764	3,366
1953:				
Jan.	14,830	4,284	15,424	3,076
Feb.	16,516	4,145	13,847	2,919

Source: U. S. Tariff Commission.

Note: (a) Includes weight of fillers, plasticizers, extenders and safety glass sheeting. Beginning January, 1951, statistics are listed on a resin content basis.

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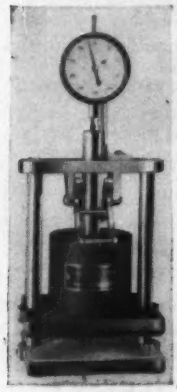

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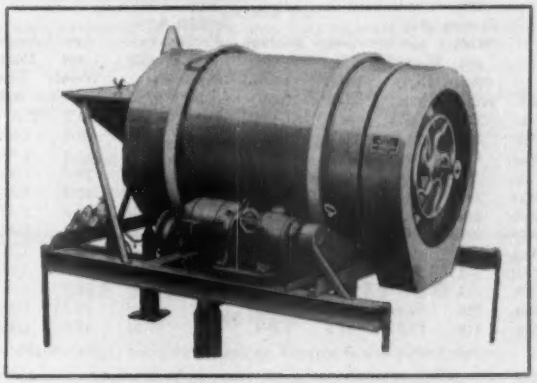

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Natural and Synthetic
Latex and Latex Compounds
for all purposes

Rubber Industry Employment, Wages and Hours

All Rubber Products

	1951				1952			
Mo.	Production Workers (thousands)	Average Weekly Earnings	Average Weekly Hours	Average Hourly Earnings	Production Workers (thousands)	Average Weekly Earnings	Average Weekly Hours	Average Hourly Earnings
Jan.	222	$66.78	40.4	$1.653	218	$74.19	40.9	$1.814
Feb.	222	63.37	38.9	1.629	215	73.31	40.5	1.810
Mar.	220	65.88	40.0	1.647	215	72.58	40.3	1.801
Apr.	219	65.96	40.0	1.649	213	71.40	39.6	1.803
May	220	68.56	41.3	1.660	213	73.47	40.5	1.814
June	220	71.27	41.9	1.701	215	75.01	40.9	1.834
July	217	70.81	41.0	1.727	202	72.15	39.6	1.822
Aug.	218	69.52	40.7	1.708	212	73.65	40.6	1.814
Sept.	218	70.18	40.9	1.716	217	75.17	41.1	1.829
Oct.	215	68.67	40.3	1.704	222	75.61	41.5	1.822
Nov.	219	69.46	40.5	1.715	227	77.44	41.3	1.875
Dec.	219	73.91	41.2	1.794	230	79.63	42.0	1.896

Tires and Tubes

Jan.	91.3	73.69	38.4	1.919	94.4	86.99	40.9	2.127
Feb.	90.6	66.95	35.5	1.886	94.2	85.75	40.6	2.112
Mar.	88.3	71.40	37.6	1.899	93.9	83.46	39.8	2.097
Apr.	87.4	70.15	37.0	1.896	94.6	81.90	39.3	2.084
May	88.3	75.92	39.4	1.927	94.6	84.96	40.4	2.103
June	89.9	82.44	41.7	1.977	95.3	87.79	41.1	2.136
July	90.0	83.67	41.4	2.021	93.4	84.22	39.8	2.116
Aug.	91.5	82.07	41.2	1.992	92.3	85.29	40.5	2.106
Sept.	92.4	81.64	40.9	1.996	93.8	86.24	40.7	2.119
Oct.	89.8	78.76	39.9	1.974	94.1	86.04	40.7	2.114
Nov.	94.8	80.27	40.5	1.982	94.6	88.02	40.3	2.184
Dec.	95.4	86.26	41.0	2.104	95.8	90.59	40.9	2.215

Rubber Footwear

Jan.	24.9	57.53	41.6	1.383	25.4	60.27	40.1	1.503
Feb.	25.3	55.87	40.6	1.376	24.7	60.46	39.8	1.519
Mar.	25.0	58.17	41.4	1.405	24.2	61.51	40.2	1.530
Apr.	24.8	59.82	42.1	1.421	22.0	59.42	39.3	1.512
May	25.4	61.48	42.9	1.433	23.5	60.69	39.9	1.521
June	25.7	59.98	42.3	1.418	23.7	61.38	40.3	1.523
July	24.8	54.68	39.0	1.402	19.0	58.83	39.3	1.497
Aug.	25.2	57.04	40.8	1.398	24.0	61.93	40.4	1.533
Sept.	25.3	55.94	40.1	1.395	24.8	63.03	40.9	1.541
Oct.	25.5	56.76	40.0	1.404	25.7	63.71	41.1	1.550
Nov.	25.6	56.64	40.2	1.409	26.0	68.71	42.0	1.636
Dec.	25.5	59.95	40.7	1.473	26.5	66.99	41.3	1.622

All Other Rubber Products

Jan.	105.8	63.06	41.9	1.505	97.9	65.63	41.2	1.593
Feb.	106.3	61.95	41.3	1.500	96.3	64.43	40.6	1.587
Mar.	106.3	63.13	41.7	1.514	97.2	64.83	40.8	1.589
Apr.	106.3	63.81	41.9	1.523	96.3	63.68	39.9	1.596
May	106.0	64.09	42.5	1.508	95.0	65.32	40.8	1.601
June	104.7	64.47	42.0	1.535	95.7	65.73	40.9	1.607
July	102.2	63.29	41.1	1.540	89.8	62.29	39.4	1.581
Aug.	101.2	61.42	40.3	1.524	95.5	65.44	40.8	1.604
Sept.	100.2	63.06	41.0	1.538	98.8	67.65	41.5	1.630
Oct.	99.4	62.68	40.7	1.540	102.6	68.95	42.3	1.630
Nov.	98.2	62.36	40.6	1.536	106.2	70.26	42.1	1.669
Dec.	97.9	65.45	41.5	1.577	107.5	73.01	43.2	1.690

Source: U. S. Department of Commerce and Labor.

Note: Data are based upon reports from cooperating establishments covering both full and part-time employees who worked during or received pay for the pay period ending nearest the 15th of the month. The employment series have been adjusted to levels indicated by Federal Security Agency data for 1947, and have been carried forward from 1947 bench-mark levels, thereby providing consistent series. Hours and earning data pertain only to production and related workers.

Production Index for the Rubber Industry

Production 1935-1939 = 100

(Based on man-hours)

	1950	1951	1952		1950	1951	1952
Jan.	194	244	248	July	222	243	225
Feb.	195	235	243	Aug.	236	243	242
Mar.	197	239	242	Sept.	244	245	252
Apr.	203	238	235	Oct.	250	239	260
May	213	247	242	Nov.	250	245	264
June	221	251	246	Dec.	251	250	273

Source: U. S. Department of Commerce.

Sales by the Rubber Industry

(In Millions of Dollars)

	1950	1951	1952		1950	1951	1952
Jan.	265	454	468	July	454	438	408
Feb.	273	434	442	Aug.	457	467	452
Mar.	293	459	406	Sept.	404	435	482
Apr.	288	439	437	Oct.	405	445	464
May	321	432	424	Nov.	397	438	403
June	350	433	430	Dec.	424	363	438

Source: U. S. Department of Commerce.

Rubber Manufacturers' Inventories

(Based upon Book-Value)

(In Millions of Dollars)

	1950	1951	1952		1950	1951	1952
Jan.	524	562	840	July	501	616	884
Feb.	526	555	848	Aug.	483	640	884
Mar.	532	554	865	Sept.	502	659	877
Apr.	536	565	877	Oct.	524	705	874
May	540	583	878	Nov.	564	739	897
June	544	610	864	Dec.	549	799	936

Source: U. S. Department of Commerce.

Various Compounding Materials Consumed by the Rubber Industry

Material	1945	1946	1947	1948	1949	1950	1951
Antimony, Primary:							
Short tons	.....	.....	39	41	55	103 e	19 e
% of total	.....	.....	.002	.003	.005	.007	.001
Asphalt: a							
Short tons	19,483	28,715	32,113	19,967	18,050	26,819	21,414
% of total	.005	.007	.007	.004	.003	.003	.003
Barite (Barytes):							
Short tons	10,000	20,000	17,000	18,000	14,000	19,000	15,000
% of total	2.1	4.4	3.1	2.85	2.53	3.31	2.13
Carbon Black:							
Short tons	402,193	470,732	471,790	435,282	383,565	515,184	530,614
% of total	95.5	95.3	94.3	95.5	93.3	92.9	92.9
Clay, Kaolin:							
Short tons	109,936	162,393	166,201	176,965	197,341	263,306	231,331
% of total	11.7	12.3	11.5	11.3	13.1	15.0	12.7
Clay, Fire & Stoneware:							
Short tons	7,800	12,951	17,970	15,480	27,148	9,500	.....
% of total	0.1	0.2	0.2	0.2	0.3	0.1	.....
Lime:							
Short tons	7,170	3,193	589	1,154	715	908	.....
% of total	0.12	0.05	0.01	0.02	.0002	.0002	.....
Litharge:							
Short tons	1,864	2,131	2,205	2,835	1,398	3,047	2,641
% of total	1.3	1.6	1.3	1.8	1.2	1.7	1.7
Lithopone:							
Short tons	977	1,607	3,085	4,192	3,245	4,092	3,295
% of total	0.7	1.1	1.9	3.0	4.1	3.9	3.2
Mica, Ground:							
Short tons	3,715	4,951	3,900	4,372	3,856	5,776	6,551
% of total	7.1	8.0	6.0	7.0	7.0	8.0	9.0
Sulfur:							
Short tons	64,960	72,800	72,800	70,560	59,360	75,000	.....
% of total	2.0	2.2	1.8	1.7	1.5	1.3	.....
Talc: b							
Short tons	63,758*	65,980	71,840	66,226	53,400	75,900	70,970
% of total	16.0	14.4	13.9	13.0	12.0	12.0	11.2
Zinc Oxide:							
Short tons	63,447	83,776	82,248	82,895	58,496	82,944	71,507
% of total	49.6	53.1	51.2	54.9	52.5	51.6	48.5

Source: U. S. Bureau of Mines.

Notes: (a) Solid and semi-solid products of less than 200 penetration. (b) Includes prophyllite and ground soapstone. (e) Does not include precipitated antimony sulfide as in previous years. * Revised.

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